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Adelle Davis, one of the country's best-known nutritionists, studied at Purdue University, graduated from the University of California at Berkeley, and took postgraduate work at Columbia University and the University of California at Los Angeles before receiving her Master of Science degree in biochemistry from the University of Southern California Medical School. Throughout her career she has worked with physicians, beginning in New York with dietetics training at Bellevue and Fordham hospitals and her first job at the Judson Health Clinic.

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Adelle Davis, who in private life is Mrs. Frank Sieglinger, is the mother of two children and lives near Los Angeles. She is the author of four bestselling books, *Let's Cook It Right*, *Let's Have Healthy Children*, *Let's Get Well*, and *Let's Eat Right to Keep Fit*. In the light of new developments in nutritional science and the steady decline in our national health, Miss Davis has revised *LET'S EAT RIGHT TO KEEP FIT*. This revised edition is also published in hardcover by Harcourt Brace Jovanovich, Inc.

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LET'S HAVE HEALTHY CHILDREN

New and Expanded Edition

by

ADELLE DAVIS

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Dedicated
to
our son and daughter,
George and Barbara,
without whose cooperation
this book would never have been written

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LET'S HAVE HEALTHY CHILDREN

CHAPTER ONE

Too Much to Hope For

It is strange indeed that the more we learn about how to build health, the less healthy Americans become. It is equally strange that a people having a tremendous respect for research should have so amazingly little interest in applying research findings. We might shrug a collective shoulder: to each his own. Certainly an adult—assuming he has an average degree of health to start with, some information, and a little money—has the right to produce health or illness in himself as he chooses. Does an adult also have the right to produce ill-health in children?

Too many American children, it seems to me, are being sold short; and too many American parents are settling for mediocre children when they could have the joy and satisfaction of superior ones.

For example, we hear a great deal these days about the compulsively hyperactive child: wiggly, squirmy, fidgety, noisy; sobbing, yelling, fighting, throwing temper tantrums; distractible and distracting human tornadoes, unable to concentrate, their attention span nil. As many as 30 per cent of all children, even in some well-to-do communities, are said to be given drugs to make learning possible and classrooms manageable. Of course, they are "harmless" drugs, merely amphetamines and dextroamphetamines. Since when have amphetamines stopped being cruelly addictive? Or any drug stopped causing liver damage or destroying many nutrients? Or teaching the young that to grab a drug when things go wrong is not making him a candidate for later—so little later—drug abuse? When drugs become harmless, they will no longer be sold on prescription.

A teacher from the New York slums and the head of an exclusively expensive private school in Southern California give me identical reports: these children come to school without breakfast, their blood sugar (necessary for brain function) already abnormally low; they get far too many sweet bakery rolls, candy bars, potato chips, soft drinks, too little sleep, too many colds, infections, allergies, their mothers often living on tranquilizers and/or suffering from asthma, nervous breakdowns, or any one of many other ailments. "The second-generation malnutrition," one teacher told me. Not the third or fourth?

Since nutritional research first began, hyperactivity has been produced in animals lacking any one of many nutrients necessary for the normal functioning of the nervous system. If these hyperactive children were recognized as victims of malnutrition and given, instead of drugs, a completely adequate diet, especially high in calcium, magnesium, and vitamins B_6 and D, the majority might soon be as relaxed as sacks of cotton, their minds far more alert, their energies restored to normal. I have seen it happen many, many times. To maintain normal blood sugar, they must be allowed frequent meals rich in protein and free from all refined foods.

Hyperactivity is only one example of dozens one might choose. Congenital abnormalities were once rare; now your friends' children have them. Scientists have learned much about nutrients necessary for brain development; school authorities say IQ's are decreasing. A shocking number of children suffer from anemia; 60 per cent of those who have been bottle-fed are said to have allergies; and the miracle drugs still perform financial miracles for pharmaceutical firms producing them, largely because of infections in the young. Arthritis (Still's disease), strokes, and even heart attacks now afflict children. Most of these illnesses can be prevented when the nutrition is consistently adequate.

We boast about being healthy without having much of a leg to stand on. One can scarcely be proud that toxemia still kills 30,000 babies each year and often the mother as well; or that our infant death rate is higher than that of other medically advanced nations. There are 16 countries having lower infant mortality than we, who now rank seventeenth; and the number of infant deaths in our country has almost tripled since 1950, increasing from 6 to 17 per 100,000 births.

In America, the harm already done by faulty nutrition is far greater than is generally recognized. In part, it causes many of our social problems; and it induces an unbelievable amount of individual misery. Every year more junk foods appear on the market and more refined foods are eaten; thus diets become progressively worse. We can therefore expect far more illnesses to occur in the future.

Even the babies are not exempt. Most babies are now fed prepared formulas of canned skim milk to which has been added vegetable oil and coconut butter, a highly saturated fat. Skim milk and coconut butter are cheap; such formulas make money for the manufacturers, take little time for pediatricians to recommend, and are easy for mothers to give, but they can scarcely be expected to build health in babies.

For instance, the news media recently reported an eight-year study conducted by Drs. Morton L. Pearce and Seymour Dayton, cardiologists from the University of California Medical School at Los Angeles. Under their guidance, approximately half of 846 volunteers at a veterans' hospital had eaten the same amount of solid fats and vegetable oils as are presumably typical of an American diet. The other half had been given substantially more vegetable oils, as sources of polyunsaturated fats. Fewer of the persons eating vegetable oils had died from heart attacks, but in this vegetable-oil group the number of deaths from cancer had increased.

Cancer is already a leading cause of death among small children. Will cancer increase in the babies now being given these oil-containing formulas? I am afraid it will, though it may be years before one can know. Furthermore, thousands of animal experiments have shown that giving highly saturated fats, such as coconut fat, increases the deaths from heart disease.

Yesterday I was discussing the commercial oil-saturated-fat-skim-milk formulas with a nutritionally trained friend. "An assembly line for the production of cancer and heart disease," she remarked. I have never been fond of the slang expression "You'd better believe it!" but it did seem apropos at that moment.

So far, medical schools have not considered nutrition sufficiently important to add to their already overcrowded curriculum. Dr. Paul György, professor emeritus of the Department of Pediatrics at the University of Pennsylvania School of Medicine, has pointed out that while medical students receive a little training in nutrition in courses in physiology, biochemistry, and clinical medicine, it is actually so sketchy and uncoordinated that they have a weak grasp of the subject and its scientific basis. He states that nutrition should be taught to all physicians regardless of their specialty; and that present-day knowledge of nutrition "has not permeated the population nor its medical guild."

Many physicians agree that medical schools should teach courses in nutrition; and they have mercilessly criticized the nutrition already taught as being inadequate, disorganized, haphazard, outdated, scattered, and woefully weak. Some time ago, the Council on Food and Nutrition of the American Medical Association reported "an urgent and immediate need for improvement," but such improvement has not yet been made.

Dr. D. M. Hegstead, of the Harvard School of Public Health, emphasizes that if physicians were trained in nutrition, "many disease states" might be prevented or certainly more readily corrected; that this problem concerns "practically the entire population of the United States"; and that because of this lack of training, the vast amount of knowledge concerning how to build health goes unused. Dr. Hegstead also points out that since giving nutrition instruction to patients is tremendously time-consuming, this work should be left to dietitians, and physicians should not be expected to do it.

For many, many years I have worked with physicians, have respected, admired, and loved them, and found them persons with great integrity and dedication. I may disagree heartily with their dietary recommendations, but if I had their training instead of my own, I would believe as they do. On one occasion I watched an obstetrician deliver a baby who died. With amazing efficiency and seeming calm, he did everything that needed to be done. When the delivery room had emptied, he sat down and cried as if his heart would break.

Groups of physicians, however, usually on the teaching staffs of medical schools, have conducted research in one phase or another of nutrition. Their findings, published largely in medical journals, are the source materials for this book.

To gather the material for this book alone, I have spent approximately two years, eight hours a day, in a medical library; and I have taken 1,282 pages of closely written notes which, to make them usable, have had to be indexed and cross-indexed. It is unfair to expect a busy physician to have this vast amount of information at his fingertips. Physicians are already overworked; and there are more than 800 medical journals for them to read if time permits. Most doctors find it impossible to keep abreast of the advances in virology, drug research, surgical technics, and dozens of kindred subjects they are expected to know.

Readers write me thousands of letters asking for the names of doctors who "follow your theories," or "think as you do." I am sorry to disappoint nice people, but such letters are thrown away. If they had been answered, there would have been no time to write this book. The fact is that much research in the field of nutrition is done by physicians, a great deal of which is the source of material for this book. I emphasize again that many physicians may disagree with my conclusions, and it is not the purpose of this book to even suggest that the reader should not follow his doctor's advice or that my ideas should take the place of a visit to a physician for his personal consultation.

Research concerns itself with only one nutrient or one variable. In contrast, nutrition is the study of 40 or more nutrients needed to build health and their relation to each other. These nutrients consist of 10 amino acids, supplied by such proteins as milk, eggs, and meats; a fatty acid found in oils; and some 15 vitamins and 15 minerals. When all of these 40 nutrients are obtained daily in amounts sufficient to meet individual needs, the diet is said to be adequate.

Space does not permit giving details concerning each nutrient required to build health. Such information is to be found in *Let's Eat Right to Keep Fit*, which should be read first to make terms used in this book familiar and less difficult for the reader.

The more an individual learns about nutrition and its personal benefits, the better health he will probably obtain. Nutrition for a pregnant woman differs little from nutrition for any person under stress; nutrition for children must be superior because of the demands of growth; therefore, much information in this book actually applies to everyone. I was delighted to find a 12-year-old girl reading an earlier edition of *Let's Have Healthy Children;* she will remember that nutrition should be made adequate long before conception occurs. One bachelor told me he had almost memorized that book, and he had influenced many people to become interested in nutrition. Any stock breeder can tell you that the health of a sire is equally as important as that of a dam.

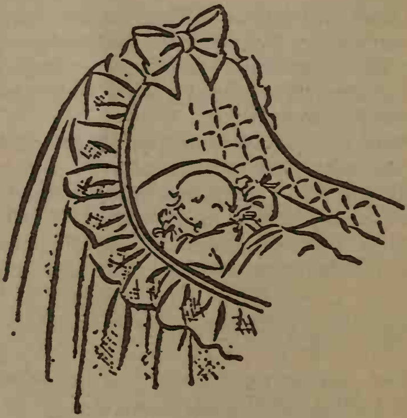
The hereditary potentials of children rarely achieve their full expression. The controlling factor is often the nutrition of the genes and chromosomes, which is limited by deficiencies existing in either parent before conception.

Such damage can be irreversible and last the lifetime of a child, yet not be obvious at birth.

For this reason, I wish that prospective parents might read this book in its entirety long before conception. Malnutrition prior to conception can bring lifelong tragedy; and information given in later chapters reinforces the need to apply the knowledge gained from earlier ones.

Perhaps it is too much to hope for, but I also wish that many persons of both sexes would become sufficiently interested in nutrition or concerned about children to read this book or at least scan its pages, even though it is written primarily for the expectant mother. Any person aware of the need for improvement can help bring about that improvement; and anyone convinced that superior children can be produced can help bring about that superiority.

The know-how is available to raise superb children of great strength and beauty. Children not yet born and not yet conceived will be the citizens and leaders of tomorrow. Our nation must stand or fall on the quality of these citizens and of these leaders.



CHAPTER TWO

A Good Diet Brings Rich Rewards

You're going to have a baby. What joys are in store for you! A thousand thrills will be yours which perhaps no one else can share: yours is the thrill of holding your baby for the first time; of stroking his head; of feeling the push of his little button nose into your neck; and of experiencing the viselike grasp of his tiny hands around your fingers. To others he may seem unattractive, and even to you momentarily, but he becomes more beautiful each minute.

You will watch him purse his lips, mouth open in birdlike fashion, as he gropes for his first meal. You will enjoy the hundreds of vague noises he makes: the squeaky sounds of satisfaction after he has been fed, almost like the creaking of a new leather saddle; the tiny rusty-hinge noises; the little piglike grunts; and the cooings of contentment. The first beginnings of a smile will probably be yours to enjoy alone. And if you are healthy and truly feminine, holding your baby to your breast and letting him nurse his fill will probably be the ultimate satisfaction of your motherhood.

There are thrills of motherhood which you will have aside from your baby. You will enjoy your own confidence, knowing that you are going to be a good mother to this child. You will enjoy the vigor of your own strong body, driving you to fulfill the baby's needs. You will experience the fun of "playing dolls" all over again. You will enjoy rocking your baby, singing him lullabies, and talking to him in language he probably understands far better than we realize. You will thank God that what was once called spoiling a baby is now known to give him a feeling of security which can last his entire lifetime.

If your nutrition has been adequate throughout pregnancy and your general health is good, what can we expect of this new baby of yours? We can, of course, expect him to be perfectly formed and free from physical defects. We can expect him to lift his head momentarily as if looking around to see what he thinks of this world he has entered. We can expect his eyes to open wide and be well focused and coordinated. You need not be surprised if his tiny legs, held in the right position, will brace themselves, even giving a miniature jump at times. If you put the baby on his face in crib or bassinet, he may even "crawl" to the head of his bed. The skin on his scalp will be beautifully clean and attractive. His sucking reflexes will be amazingly strong, and he will have no trouble in taking the nipple. If his needs are fulfilled as they should be, you will probably be surprised how seldom he cries.

Such is the picture of a well-nourished mother who has brought into the world a well-nourished baby. Unfortunately, the picture is often different indeed. The exhausted and undernourished mother can almost hate this ugly thing which has caused her such pain. She may be irritated by his crying and suffer pain from his nursing, her nipples perhaps cracked and bleeding. Her confidence is crowded out by fears and worries. She may be afraid to pick up her baby or to wash his scalp thoroughly. Every spitting up of milk or change of texture in the stools may indicate to her possible illness and make her fly in fear to phone her doctor. Tension replaces relaxation, and she probably looks forward to night feeding with dread.

Her infant, born undernourished, cannot compare with the healthy one. His head wobbles. His eyes are not coordinated or well focused. His eyelids may rarely open at first. His head may be covered with unsightly "cradle cap." He is not able to brace his feet, to "crawl" in the crib, or to lift his head easily. His sucking reflexes may be so weak that he cannot nurse strongly enough to stimulate normal milk flow. In fact, he may even refuse to take the breast. He probably cries irritably much of the time. He not only may be in poor general physical condition, but also may have been born with one or more congenital defects.

It now appears that every woman, by her choice of foods before and during pregnancy, largely determines the type of baby she will produce. Although hundreds of studies, both with pregnant women and with experimental animals, help to justify such a statement, particularly outstanding is research done years ago by two groups. One study was made by doctors from the School of Public Health at Harvard University, working at the prenatal clinics of the Boston Lying-in Hospital; and the other by physicians from the Department of Obstetrics and Pediatrics of the University of Toronto Medical School. In each case, detailed information was gathered concerning the food eaten by the women when they first reported at the prenatal clinics, usually during their fourth month of pregnancy, and continuously afterward until their babies were born.

In the Harvard study, 216 women were classed into five groups according to their diets: excellent, good, fair, poor, and very poor. The Toronto doctors divided their expectant mothers, 400 in all, into three groups according to the diets they had followed: poor, good, and poor supplemented to good. In this study, money was available to help some of the women who could not afford nutritious food. Of the expectant mothers coming to the clinic, alternate patients whose diets were poor were put into a group which would receive supplements. An egg, an orange, and 1 quart of milk were delivered daily to each patient of the latter group; 1 pound of cheese, a few cans of tomatoes, and a package of wheat germ were delivered each week. The women were supplied with capsules containing 2,000 units of natural vitamin D to be taken daily. A social worker called at the homes to see that other members of the family were not eating the food provided. The women were asked to have at least half of their breads and cereal of whole grains, and to use only iodized salt.

Babies are healthier when the mothers' diets have been good. In both the Toronto and Harvard studies, the infants were examined by pediatricians who were unaware of the quality of the food eaten by the mothers. When the prenatal diets were correlated with the condition of the infants, the Harvard group found that 87 per cent of the mothers whose diets had been adequate gave birth to infants in good or excellent condition. Another 10 per cent of the babies had only minor counts against them, such as mild inflammation of the eyes or small umbilical hernias. Only one infant of the entire group was defective; he had a congenital heart abnormality.

In contrast, when the mothers' diets had been particularly inadequate, 95 per cent of the infants were found to be in poor or extremely poor physical condition. The group in extremely poor condition included infants who were stillborn; infants who died a few hours or days after birth (one died of bronchitis and another of bronchopneumonia when three days old); feeble-minded and mentally retarded babies; and infants with cleft palates, congenital heart defects, and congenital cataract. The group in poor condition included babies with such abnormalities as tumors, clubbed feet, crossed eyes and other eye abnormalities, and several infants suffering from thrush and severe skin infections. Many of these infants were born prematurely. Of all the infants of the women whose diets had been poor, only one was judged to be in excellent health and another in good condition.

The findings of the Toronto doctors were similar. When the mothers' diet was poor, more than 3 per cent of the babies were born dead, whereas no stillbirths occurred among women whose diets had been good. Four times as many babies were born prematurely to women whose diets had been poor as to the women whose diets were adequate.

Labor is easier when the prenatal diet has been good. The Toronto doctors found that women whose diets had been poor and difficult labor, whereas fewer women who had eaten more adequately had difficulty (24 per cent compared with 3 per cent). Yet the women on the poorer diet gave birth to twice as many premature infants, who were naturally smaller than full-term babies. More of the poorly fed women suffered hemorrhages during labor, and three times as many contracted infections of the uterus. Twice as many suffered from breast infections, and three times as many had breast abscesses.

The Harvard group also found that, in spite of the fact that the babies were much smaller, labor was more difficult and the complications far more severe when women had eaten a poor diet during pregnancy. The actual hours of labor for women having their first babies was the same in both groups, but for women who had had one or more children, the hours of labor were found to have decreased almost by half when the diets had been good. The women having more adequate diets suffered fewer hemorrhages, and their uterine contractions were stronger. The poorly fed women convalesced more slowly, and three times as many suffered from such major complications as severe hemorrhages; infections of the uterus and urinary tract; phlebitis; high blood pressure; and inflammations, infections, and abscesses of the breast as did the better-fed women.

Pregnancy is more normal when the diet is good. The Toronto group found that almost six times as many women on an inadequate diet had poor health during pregnancy, compared with the health of women staying on a good diet. Almost twice as many of the poor-diet group suffered from severe anemia, eight times as many were threatened with miscarriage, and twice as many suffered from toxemia. None of the group having the better food had miscarriages, whereas 6 per cent of the inadequate-diet group miscarried.

The Harvard study revealed that when the women stayed on a good diet, only about a third suffered some nausea and staining, or threatened miscarriage. Of the women on poor diets, 58 per cent developed severe complications. Almost half of these women suffered from toxemia, whereas none of those on good diets developed toxemia.

An expectant mother can appear to be healthy; yet her baby may be abnormal. A striking fact was brought out by the Harvard study: many of the inadequately fed women appeared to be in good health during their pregnancy but gave birth to infants who were in extremely poor physical condition. In fact, 42 per cent of these women progressed satisfactorily during pregnancy; yet only 5 per cent of all the babies in this group were in good condition. There has been a general belief that a pregnant woman's health was sacrificed for her infant and that if the mother was progressing satisfactorily, her baby would be healthy. The Harvard doctors point out: "It may be entirely possible that a woman may run an apparently satisfactory clinical course, but if she is consuming an inadequate diet, the fetus will suffer."

Mothers whose diets are good during pregnancy have a better chance to nurse their babies. The Toronto group found that when a mother's diet had been good during pregnancy, she not only secreted more milk but could also nurse her baby much longer than could a woman whose diet had been inadequate. By the time the babies were six weeks old, three times as many women from the poor-diet group were bottle-feeding their infants. When supplementary foods were no longer delivered to the homes, the diets of the mothers became so inadequate that only a few of them could continue nursing their babies.

Although the Harvard group does not report the effect of the diets upon breast-feedings, much other research indicates that a mother's ability to nurse her infant successfully may be determined by her diet before the baby is born.

When the prenatal diets had been good, the babies stayed healthier. The Toronto group found that by the time the babies were six months old, five times as many whose mothers had been on an inadequate prenatal diet had suffered from frequent colds as had infants whose mothers' diets had been good before their birth. Three times as many infants from the poor-diet group had suffered from bronchitis, four times as many had had pneumonia, almost three times as many were anemic, and six times as many had failed to grow normally; and far more had suffered from severe diarrhea and middle-ear infection. None of the infants whose mothers had stayed on the good diet had rickets, whereas a number of the poor-diet infants not only had severe rickets but also had convulsions (tetany) caused by poor absorption of calcium. Three of the infants whose mothers' diets had been faulty died before they were six months old, though there were no deaths in the other group.

The Harvard physicians also found that there were more infections among the babies whose mothers' diets had been poor. This increased incidence of infections occurred particularly during the second half of the first year of life.

Similar studies made in different parts of the world also show that the better the nutrition, the easier is the delivery and the healthier are both the mother and child. Often the obstetricians have not seen the expectant mothers until the fourth month of pregnancy, yet even belated dietary improvement has helped infants to have a better start in life.

The most recent findings contradict old beliefs and emphasize concepts which few obstetricians can yet accept. For example, physicians have believed that when a nutrient was limited, the unborn infant had priority and the mother's body was sacrificed if necessary. It is now known that the mother's health is protected at the expense of her unborn infant; and that if she controls her weight too rigidly during pregnancy, she stands a far greater chance of having her baby stillborn or born prematurely, of the baby's dying soon after birth, of being dull, physically defective, mentally retarded, and/or afflicted with cerebral palsy. The growth of the human brain reaches its peak during the last months of pregnancy; if the mother's diet is too restricted, the optimum number of brain cells can never be produced; therefore higher intelligence is associated with a greater gain in weight during pregnancy than was formerly considered acceptable. Contrary to general belief, difficult births are caused by poor nutrition and have little relation to the size of the baby.

Advantages omitted by research. An extremely important factor omitted by the scientists is the effect of good nutrition upon the mother's emotions and upon her home life. A young woman whose prenatal diet had been excellent recently phoned me soon after her delivery.

"I feel wonderful," she exclaimed. "My delivery was a breeze, but it kills me to have to stay in the hospital another day. I'm dying to get home and take care of my baby."

Though I saw a great deal of this happy mother, her fine young husband, and their beautiful infant, never once did I hear of worries or complaints of fatigue, nor did I see signs of tension or irritability to mar the graciousness of their home.

In contrast was another young mother, whose income was more than adequate but whose diet was atrocious. She was ill during much of her pregnancy and far from well afterward. She worried constantly, was depressed and easily angered, and frequently sobbed without knowing why. Her infant had colic for weeks and, although kept under barbiturates, cried piteously much of the time. The young husband, worried sick and exhausted from lack of sleep, dropped in to see me and blew his top. Having that baby was a frightful mistake. He hated the squalling thing. It had ruined Dorothy's health. Their married life had gone to pieces. She cared nothing for him now, only for the baby.

Tension and irritability, depression and uncontrollable weeping have all been produced in persons who have volunteered to stay on inadequate diets, particularly diets deficient in almost any one of the many B vitamins. Lack of graciousness in the home can be the result of an inadequate diet just as much as can an infant born in poor physical condition.

An adequate prenatal diet is worthwhile. That an adequate prenatal diet is worthwhile can no longer be doubted. Many fine obstetricians are fully aware of its value and make every effort to keep their patients on adequate diets. Unfortunately, other obstetricians have little interest in nutrition and believe that a "well-balanced diet"—whatever that means—supplies everything the expectant mother needs. Such doctors sometimes recommend inadequate diets which may actually produce illnesses in the mother and abnormalities in her infant.

There are also thousands of conscientious women who are eager to do everything in their power to insure that the child they carry will be healthy and intelligent. There are other women who eat as they please regardless of the effect upon themselves or their infants, although they may be able to afford the best food available. If they are ill during their pregnancies or their infants are defective in one way or another, such, they believe, are the accidents of nature.

The Harvard group, in summarizing the report, made this statement: "There can be no doubt from these findings that if the mother's diet during pregnancy is poor to very poor, she will in all probability have a poor infant from the standpoint of physical condition. If the mother has a good or excellent diet, she will probably have an infant in good or excellent condition."

You, as an intelligent expectant mother, can produce the type of infant which will make you proud and happy that your diet was adequate during your pregnancy.

CHAPTER THREE

Prepare for Your Baby Before Each Conception

During the past years many fine young women have come to consult me, often with their husbands, and have told me that they are ready to start rearing their families but wish to be in as nearly perfect health as possible before they become pregnant. Frequently they have talked about a sister or friend who has been particularly ill during pregnancy, and they wish to avoid a similar experience. To follow an adequate diet is not difficult for these girls. They have a goal which thrills them and is worth working for. They will not be fighting nausea, as perhaps they might if they waited to improve their diets after they became pregnant. Regardless of how unpleasant a food may taste, if that food supplies nutrients which will eventually help their babies, they have been good sports about eating it.

I have seen these young women again during their pregnancies. Most of them have never experienced a day of nausea. They have rarely had to worry about threatened miscarriage. Instead of the dozens of complaints one usually hears from a group of expectant mothers, these girls almost invariably make the remark, "I've never felt better in my life!" Not one of them has given birth to a premature, stillborn, or malformed child. In due time they have visited me with their babies, and they have been beautiful babies indeed.

Improve your diet before each conception. Usually a woman eats whatever food she happens to enjoy. Probably she suffers a number of mild nutritional deficiencies; perhaps her blood pressure or blood count is a bit low; she may have an occasional bout with constipation or headaches; she has some tooth decay, her gums may bleed a little, and she bruises easily; she perhaps suffers from a few colds or some mild infection or has a touch of hay fever. She considers herself healthy, however, because of low standards.

In this condition she conceives and is perhaps aware of conception only after nausea sets in. Even though the nausea is mild, it is almost impossible for her to eat an adequate diet during this period. Her deficiencies become more severe, while her nutritional requirements greatly increase. The nausea often lasts for three months and sometimes develops into pernicious vomiting. Even if she follows an excellent diet during the remainder of her pregnancy, it is impossible for her to make up for harm already done to her baby. Her chances of producing a really superior child were sacrificed *before* she conceived.

Several babies in close succession. I recently saw a mother with a boy three years old, a girl 11 months younger, and a baby of a few months. The boy was a beautiful child, the girl a pathetic little thing, and the baby, who had been ill since birth, was a sad picture indeed. The mother told me, with apparent surprise, that the oldest child had been so easy to care for, the second one had been considerable trouble, and the third had caused constant worry and anxiety. You can find hundreds of similar examples if you look for them.

When a mother is fairly healthy and her diet, although unplanned, happens to be more or less adequate, her first baby is usually a fine, normal infant. He has, however, probably robbed her body of any calcium, phosphorus, and iron which may have been stored. Unless her diet has been excellent, the increased requirements of pregnancy have left her with multiple subtle deficiencies. In this condition, she again conceives. She is so busy taking care of her first baby that she has little time to prepare food for herself. Chances are the budget is more limited, and she "economizes" by buying less expensive foods. Furthermore, her confidence has soared because she has produced a healthy infant without special attention to diet, and she feels she can do it again. Her deficiencies become more severe and more difficult to overcome; the second baby is less healthy than the first. Thus each successive child is probably born more and more undernourished. Yet the mother rarely recognizes that she herself has needlessly robbed her younger children of their birthright, that of a healthy body.

If you wish to have your children in close succession, keep your diet unusually adequate not only during but also between pregnancies. With each successive child, adhere to a nutritious diet still more rigidly. Know that your own requirements are increased not only by the demands of pregnancy but also by your greater physical activity necessary in caring for your babies.

Trouble during a previous pregnancy. If during a previous pregnancy you have had trouble which may have been caused by dietary deficiencies, it becomes extremely important to stay on a completely adequate diet for six months or longer before you conceive again. Perhaps you experienced unusually severe nausea, a threatened miscarriage, or toxemia, or your baby, born prematurely, had to be kept in an incubator while you longed to care for him yourself. If dietary deficiencies have caused these abnormalities and are not corrected, the chances are they will become far more severe during stress of another pregnancy, causing pernicious vomiting, miscarriage, or a stillbirth. The outlook is not a happy one.

On the other hand, the longer you stay on an adequate diet prior to conception, the less chance there is that any abnormalities will occur. Two women whom I remember had four and five miscarriages, respectively, yet they gave birth to beautiful children after their preconception and pregnancy diets were improved. I also recall several women who had had severe convulsions before a delivery, yet by improving their diets they experienced no difficulty with a following pregnancy. I recently saw a woman who had developed toxemia twice, and each time had given birth to a premature infant. After the birth of her second baby, she became interested in nutrition and kept herself on an unusually adequate diet. A third pregnancy resulted in fine twin girls who were born at term, which is rare. Twins are usually born prematurely because the nutritional demands on the mother are so great that no ordinary diet can meet the requirements.

Difficulty in conceiving. Malnutrition of either husband or wife can prevent conception. Vitamin-A deficiencies drastically lower experimental fertility and damage the sperm-producing cells. Mild deficiencies of vitamin E allow fewer sperm to be produced, whereas a severe lack causes permanent sterility in the male. Conversely, when men have increased their vitamin-E intake, the quality of their sperm improves markedly, especially if vitamin A and E are taken together.

Inadequate B vitamins and protein limit sperm motility and the production of both ovum and sperm. A lack of the B vitamin pantothenic acid or vitamin B_{12} causes infertility in animals and damages the testicles; and when infertile men have taken vitamin B_{12}, the sperm count has increased from 3 million sluggish cells to 140 million highly active ones. Injections of vitamin B_{12} have also helped sterile anemic women to conceive.

A lack of manganese or zinc, both deficient in our soils, markedly decreases fertility in laboratory and farm animals. Too little manganese can even cause a total absence of sperm. If the diet is adequate, zinc, essential to the fertility of both sexes, is found in larger amounts in the sperm, testicles, and prostrate than elsewhere in the body; and conceptions have occurred after husbands and their wives have taken 250 milligrams of zinc daily.

Many women who are sterile when overweight conceive after reducing on a high-protein diet free from refined sugar. Conversely, failure to conceive can be caused by eating too little, a fact revealed by studies of undernourished women during World War II. Smoking and drinking reduce both the number of live sperm and their motility, and conceptions often occur after these habits have been given up.

If you have difficulty in conceiving, go with your husband to a good gynecologist. In addition to following his advice, it is important that both you and your husband stay on the best diet you possibly can. Since the diet for pregnancy (ch. 10) is planned to be adequate in all known nutrients, it can serve as a guide for you to follow.

Should your sterility remain cruelly permanent, by all means adopt a baby. An Italian woman once said to me, "When you havva no babies, you havva nothing."

Your nutritional needs will skyrocket. Pregnancy is indeed a stress, and all stress increases the need for every nutrient essential to health. The requirements for vitamin B_6, the B vitamin folic acid, and vitamin E all appear to soar immediately after conception. For example, the symptoms produced in volunteers lacking vitamin B_6 are the very ones most women experience sometime during pregnancy: nausea, vomiting, leg and foot cramps, nervousness, trembling, tingling and numbness in fingers, insomnia, dizziness, headaches, irritability, fatigue, dandruff, halitosis, abdominal gas, anemia, foul odor to the stool, water retention, hemorrhoids, and painful itching around the genitalia. When 10 milligrams of vitamin B_6 have been taken daily for a month or two before pregnancy, these unpleasant symptoms, including nausea, have been prevented; but if vomiting has once started, 250 milligrams daily have been needed to stop it.

Despite the fact that some obstetricians have used vitamin B_6, or pyridoxin, successfully to correct nausea and vomiting since 1942, other doctors still give highly toxic antinausea drugs chemically similar to thalidomide or another drug, a synthetic progesterone, which has caused baby girls to be born as hermaphrodites, with overdeveloped male sex organs. Even if no drugs are taken, nausea and vomiting can cause sufficiently severe nutritional deficiencies to inflict congenital malformation or brain damage on the fetus.

When vitamin B_6 is inadequate, a substance known as xanthurenic acid is excreted in the urine. By measuring the quantity of this acid, the severity of a vitamin-B_6 deficiency can be determined. Such urine tests have shown that almost all pregnant women whose diets are not supplemented daily with at least 10 milligrams of vitamin B_6 are deficient in this nutrient; and that the need for vitamin B_6 remains high throughout pregnancy.

Because oral contraceptives mimic pregnancy, they increase the need for vitamin B_6, folic acid, and vitamin E. Even when oral contraceptives have been discontinued months before conception, deficiencies of these nutrients usually still exist. Any woman who has used oral contraceptives or has suffered from vomiting or other vitamin-B_6-deficiency symptoms during previous pregnancies would undoubtedly be wise to take daily for months before conception 10 milligrams of vitamin B_6, 5 milligrams of folic acid, and 200 units or more of vitamin E.

Prevent miscarriage before conception. Probably every nutrient plays some role in helping to carry through a normal pregnancy. A lack of vitamin E, essential to cell division, appears to be one of the most damaging. In one study, 81 women who had suffered 227 previous miscarriages gave birth to 61 healthy babies after they had been given small amounts of vitamin E daily before the next conceptions; and in another, 72 women who had experienced four and five miscarriages each all produced full-term infants after receiving the vitamin. Women who have repeatedly miscarried have most often produced healthy infants when both they and their husbands have taken vitamin E for months before conception and they have continued the vitamin throughout pregnancy. These same women have again miscarried during later pregnancies, however, if they have discontinued vitamin E. This vitamin is thought to be effective in preventing abortions because it markedly decreases the need for oxygen, at first meagerly supplied the newly formed embryo.

Threatened abortions have at times been prevented when vitamin E has been first given after spotting or hemorrhaging has occurred. Women who have suffered threatened miscarriages, however, give birth to a much higher percentage of malformed babies than others whose pregnancies were normal. One doctor reported that of 232 women first given vitamin E after miscarriages threatened, 195 had normal babies, 12 had deformed infants, and 25 aborted. In a similar study of 4,141 threatened miscarriages, the women were given 450 units of vitamin E daily; 96.8 per cent gave birth to normal babies, but the remainder were lost or defective.

Another cause of miscarriage, particularly tragic for American women, is a lack of the B vitamin folic acid. This vitamin is necessary for the formation of the nucleic acids DNA and RNA, which carry heredity patterns and help synthesize the body protein in every cell from the moment of conception on. If the baby is to be normal, folic acid must be adequate before new life is formed.

Studies have shown that more than half the women who have miscarried or have had spotting during pregnancy are deficient in folic acid. Many seemingly healthy women who had suffered repeated abortions not prevented by vitamin E have produced normal babies after being given 15 milligrams of folic acid daily before and during their pregnancies. In some cases, as little as 0.5 milligrams of folic acid daily has prevented miscarriage. Giving this vitamin after bleeding has started does not prevent a miscarriage; irreversible damage is done to the fetus immediately after conception. A deficiency of folic acid too mild to induce an abortion can still cause the placenta to become detached from the uterine wall, a condition known as *abruptio placentae,* which is a common cause of premature births. Furthermore, women undersupplied with this vitamin have twice as many deformed babies as do women given folic acid before conception.

Many investigators consider a lack of folic acid to be the most common nutritional deficiency during pregnancy; and they recommend that every woman who has previously miscarried take at least 5 milligrams and other women at least 0.5 milligrams both before conception and throughout pregnancy. Though urine tests now show that one pregnant woman in every five lacks this vitamin, of 48 different multiple vitamin supplements especially designed for American women, none contain folic acid.

In contrast, English obstetricians are fully aware of the value of folic acid and have given it to some 20,000 pregnant women with excellent results. Folic acid is not toxic; as much as 200 milligrams have been given daily, and even 500 milligrams daily have been used to treat sickle anemia. There is, however, no need for huge amounts, and the effect of high doses of folic acid on the fetus does not appear to have been definitely established. In this connection, our Food and Drug Administration allows only 0.1 milligram of folic acid to be sold without prescription. Their "reasoning" is that people deficient in vitamin B_{12}—mostly strict vegetarians—fail to consult a physician quickly enough to prevent irreversible damage unless they are also deficient in folic acid. The wisdom of this edict is questioned even by the National Academy of Sciences–National Research Council, especially since a vitamin-B_{12} deficiency can now easily be detected by a urine analysis; they recommend eight times more folic acid for a pregnant woman than can be purchased without a prescription.

No other country in the world restricts the sale of folic acid. I have purchased this vitamin in England, Switzerland, and Canada. Because folic acid is harmed by heat and lost in cooking water, it is not easily obtained unless yeast, wheat germ, and green leafy vegetables are eaten daily. Yet if you do nothing else in preparing for conception, at least get some source of folic acid.

Many conditions can cause miscarriages: measles and other infections, possibly by inducing severe vitamin-A deficiencies; an undersupply of vitamin C and/or bioflavonoids (both have been used successfully in treating habitual abortion); too low a calorie intake, whether caused by vomiting or fear of gaining; a protein intake of less than fifty grams; nitrates and nitrites from chemical fertilizers or food preservatives; oral antibiotics which, by causing a vitamin-K deficiency, can bring on a hemorrhage in the placenta; and heavy smoking. Even women who work in tobacco plants but who do not smoke have a high rate of miscarriages.

Experimental animals deficient in the B vitamin pantothenic acid readily miscarry; and all varieties of farm stock abort when their diets are deficient in iodine, a nutrient which decreases both miscarriages and stillbirths when prenatal diets for women have been supplemented with it. Probably all nutrients essential for cell division and the formation of RNA and DNA, such as zinc, are important in preventing abortion.

Smoking before and during pregnancy. Smoking increases the requirements for most nutrients, especially that of vitamin C. By preventing this vitamin from being utilized normally, nicotine interferes with the synthesis of two substances vital to brain development, norepinephrine and serotinin; and studies of the head circumference of infants whose mothers have smoked during pregnancy indicate that brain damage is common. The amount of vitamin C in the blood drops drastically, leaving both mother and child susceptible to infections, allergies, and other abnormalities, and though vitamin C acts as a detoxifying agent in the body, there is no evidence that the best of nutrition can prevent harm done by smoking.

Smoking is known to reduce the quality of both sperm and ovum. An amazing number of studies involving many thousands of women show that expectant mothers who smoke before and during pregnancy more frequently experience early bleeding and miscarriages; they have more premature births and more of their infants are born dead or die soon after birth than do babies of women who refrain from smoking.

Dozens of investigations show that smoking during pregnancy causes infants to weigh little at birth. The more cigarettes smoked, the smaller the babies are; and these babies remain underdeveloped at the end of the first year. Approximately a third of the tiny babies formerly classified as premature are now known to be full-term infants whose intrauterine growth has been stunted. Carbon monoxide from smoke, thought to be the cause of such stunted development, enters the mother's blood and passes into the infant's circulation; it combines with hemoglobin, or the red coloring matter of blood, taking the place of oxygen. Oxygen starvation is thus produced, harmful to all parts of the body, but particularly to the brain. It is little wonder that a great many of these infants die. Laboratory animals, forced to breathe cigarette smoke only 20 minutes daily, give birth to congenitally damaged young with abnormal adrenal glands.

Without exception, physicians who have studied this problem agree that an intensive effort should be made to dissuade women from smoking during pregnancy and to help them realize that smoking puts their own lives in jeopardy and exposes their unborn infants to unnecessary risks.

Malformations can be prevented. The relation between maternal diets and malformations in the young was first shown when sows, deficient in vitamin A before being bred, gave birth to pigs without eyeballs and with harelips, cleft palates, and other abnormalities; if the sows were given vitamin A once before breeding, the little pigs had eyeballs but were blind. Many varieties of animals deficient in this vitamin have now produced young which were blind or deaf, had clubbed feet, cleft palates, and harelips, and/or deformities of the heart, kidneys, lungs, testicles, and other parts of the body. Frequently a single animal has many deformities. Sometimes all the young have defective eyes, and three-fourths have heart abnormalities.

Deformities have now been produced by maternal diets deficient in almost any nutrient and by adding to adequate diets tiny amounts of toxic drugs. Unfortunately, the young can be severely malformed by deficiencies bringing no apparent harm to the mother.

For example, every type of malformation found in humans occurs in animals lacking folic acid, a deficiency sometimes called "the monstrosity producer." Women shown by urine tests to be lacking folic acid have given birth to twice as many malformed babies as women receiving the vitamin; and when a drug replacing folic acid was given to pregnant women, their babies were born with major malformations. Conversely, when women who have produced deformed children have taken 5 milligrams of folic acid daily starting a month before a planned pregnancy, each had healthy babies. The average American diet supplies daily only about one-third of the amount of folic acid needed by a woman preparing for a pregnancy (0.35 milligrams); and blood analysis indicates that one in every five pregnant women is so low in folic acid that miscarriage, premature delivery, birth defects, or infant death can be expected. For the sake of children still unborn, I wish that every reader of this book would write the President, his senator, and his representative, asking that the Food and Drug Administration permit the sale of folic acid without a prescription (p. 66).

A lack of vitamin B_2 ranks close to folic acid as a deformity-producer; animals undersupplied with this vitamin have a high percentage of eye abnormalities, foreshortened limbs, cleft palates, fused fingers and toes, and a variety of other malformations. The young of pantothenic-acid-deficient animals have eye abnormalities and severely damaged brains. Rats deficient in zinc or manganese give birth to malformed offspring; and certain hereditary defects have not been transmitted to the young when the diet was rich in manganese, but did appear in following generations when manganese was deficient. Pregnant animals mildly deficient in vitamin E likewise give birth to young with severe eye defects; most have incompletely developed hearts or damage to the brain and other organs. Congenital heart malformations have increased progressively as the American diet has become increasingly deficient in vitamin E.

Malformations similar to those caused by thalidomide have been produced experimentally by diets deficient in vitamins A, B_2, E, or the B vitamins pantothenic acid, niacin amide, or folic acid; by giving penicillin, streptomycin, tetracycline, or other antibiotics; by many drugs including those still used to stop nausea; and by inducing virus infections early in pregnancy. When many groups of rats, each deficient in a different vitamin, have been given thalidomide, the groups lacking vitamins B_2, E, or pantothenic acid have produced young with the most severe and numerous deformities; and deficient animals receiving thalidomide were in far worse condition than those on adequate diets when given the drug. Conversely, the toxicity of thalidomide given experimentally has been overcome by adequate diets high in vitamins B_2, K, or niacin amide. Many women who took thalidomide gave birth to normal infants, apparently avoiding tragedy by selecting adequate diets before conception and early in pregnancy.

Mothers of infants born blind, deaf, or with defective kidneys, lungs, brains, feet, or with congenital heart disease have often suffered acute infections early in pregnancy. In one study, women who had given birth to 545 grossly malformed children were found to have been deficient in almost every nutrient; and adding a single vitamin to a mother's diet during pregnancy has caused a decrease in malformations. When a group of pregnant women was given several B vitamins including 5 milligrams of folic acid daily, congenital malformations decreased to half the expected rate. Similarly, vitamin E, taken by 17 men whose wives had given birth to monstrosities, allowed 17 later pregnancies to result in 15 normal babies and two malformed ones. Giving vitamin E to male rats immediately before breeding has markedly reduced congenital defects in the young.

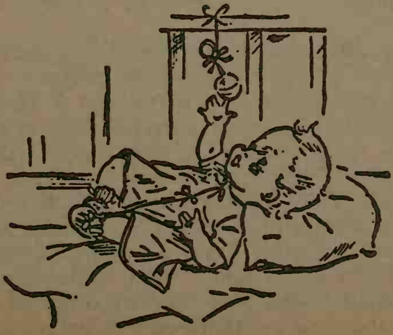
The malformations reported at birth have increased steadily during the past 40 years; yet the great majority of defects are in children who as newborn infants appeared to be normal. Such problems as visual, speech, and hearing abnormalities, undescended testicles, twisted ureters, congenital heart malfunction, and dozens more may not be discovered until a child is of school age.

A look to the future. Because our national diet becomes progressively worse each year, we can expect far more miscarriages, premature births, and deformed babies to be born in the future. The cost to our nation of supporting malformed persons is staggering. Far worse is the lifelong heartbreak of millions of parents who wanted healthy children and the lifelong misery of youngsters who want beautiful bodies.

Nine months of excellent food, however, cannot make up for a lifetime of faulty nutrition. If nutrients normally stored in your body have already been depleted by previous pregnancies or inadequate diets, you cannot hope for a superior child.

If during your teens you starved to maintain your weight or lived on greasy hamburgers and soft drinks but are now planning a family, give yourself six months or longer to prepare for a healthy baby. The more inadequate your diet has been, the more complete it should be now and the longer the period allowed for rebuilding. If you have already had a miscarriage, a malformed child, or several pregnancies in close succession, the danger of disaster is greatly increased unless your diet is more than adequate for many months before another pregnancy. Your joy of having a beautiful child is ample reward for patience.

See your physician before you become pregnant. Try to have a physical examination before each pregnancy; and ask your physician for a prescription of at least 1-milligram tablets of folic acid. If your blood count, blood pressure, blood sugar, or blood cholesterol deviates from normal, take steps to correct it as well as other problems which may be discovered. The prenatal diet (ch. 11), planned to supply adequate amounts of all known nutrients, can serve as your guide.



CHAPTER FOUR

Can We Make Johnny Smarter?

Most people believe that intelligence is largely inherited, and if a child fails to be smart, it is because he had the wrong ancestors. Usually the blame has been put on dreary old Aunt Nettie, who obviously does not have all her buttons. Though each individual's intellectual potential is limited by his heredity, probably few persons have ever reached their own potential.

In every type of experimental animal, if the mother has been kept on an inadequate diet and/or if her offspring have been poorly nourished, the brain cells of the young are permanently damaged. The same is true of humans. One scientist has stated, "If there is famine during life's first years, no later feasts fully mend its ravages."

Research now indicates that, aside from heredity, intelligence can be determined by the adequacy of the diet before conception, throughout pregnancy, and during the first months of life; and that malnutrition affects intellectual development fully as much as it does physical development.

Most scientists agree that since the beginning of this century there has been a progressive increase in the number of mentally defective children and a corresponding decline in the intelligence of our population as a whole. In our own city, the average IQ of our school children is said to have dropped 9 points in the past few years. Each year in the United States approximately 126,000 infants are born who are known to be mentally retarded. Some scientists estimate that faulty brain development occurs in 10 per cent of all births. Aside from inadequate nutrition, mental retardation can be caused by drug toxicity, damaged genes, and virus infections early in pregnancy.

Measuring brain power. One of the great recent advances has been the understanding of two vitally important substances, DNA and RNA (desoxyribonucleic acid and ribonucleic acid). A certain quantity of these acids exists in the nucleus, or ruling center, of every cell. They carry the hereditary pattern of our inheritance, or the genetic code of all body enzymes; and they direct the production, or synthesis, of all body proteins, thus giving each part of the body its individual characteristics.

The amount of both DNA and RNA in every cell remains the same; and throughout life DNA and RNA reproduce themselves with each cell division provided the diet is adequate. In this manner growth can occur, the brain can develop, worn-out tissues can be repaired, and healing can take place. Many nutrients, however, are essential before DNA and RNA can be synthesized; when any of these nutrients are not available, all growth, including brain development, and repair come to a halt. If the nutrients are soon supplied, growth is resumed; if not, permanent damage occurs.

The amount of DNA and RNA is far more concentrated in the brain than elsewhere in the body. Since the quantity in each cell remains constant, by measuring either the DNA or RNA scientists can determine the number of brain cells and thereby the development of the brain itself.

A role in memory and learning. If mice and rats are kept in well-lighted cages but provided with a dark shelter, they quickly seek the darkness. When they are given an electric shock every time they go into the dark, however, they soon learn that it is safer to remain in the light. If these "educated" animals are then killed, and either an extract from their brains or only the RNA from their brains is injected into "uneducated" mice and rats, these uneducated animals "learn" without being taught by electric shocks that they must stay in the light. Identical preparations from the brains of animals never treated with shock have no effect. Such experiments and many similar ones, some even conducted with worms, indicate that RNA retains memories and is an important factor in learning from past experiences.

Since RNA and DNA are vital to both the development and function of the brain, a deficiency of any nutrient essential for their production can cause brain damage and mental retardation.

Time of brain development. Though the brain develops throughout pregnancy, it reaches its peak of growth during the last three months before birth and the first six months of life. Growth then occurs slowly until the age of four, after which the brain increases little or none in size. Dietary deficiencies are most harmful during periods of greatest brain growth; in general, the earlier a deficiency occurs, the more damage it does. Once the brain is fully developed, however, it can withstand severe dietary deprivations or even starvation and, though severely affected at the time, it will return to normal when the diet is improved.

Analyses of presumably normal brains, collected from therapeutic abortions, stillborn infants, and children dying accidental deaths, show that the amount of DNA increases rapidly up to the time of birth; it then increases more slowly until six months of age and very little afterward. In comparison, brains of infants dying of malnutrition were smaller and contained much less DNA, RNA, and protein. Similarly, the amount of DNA in the brains of infants born prematurely revealed that they had less than half of the brain cells of normal full-term babies. Furthermore, autopsy analysis of the brains of 1,094 malnourished children, compared to those of intelligent youngsters, showed that the poorer the nutrition, the smaller was the brain, the fewer cells it contained, and the less it weighed.

The effect of inadequate protein. Mental retardation in rats, judged by reduced ability of the young to run mazes and/or by the DNA content of the brain, has been produced by giving the mothers during pregnancy diets deficient in protein. Even if the diet is adequate in every respect except that it is low in calories or is lacking an essential amino acid, the brains of the young remain small and underdeveloped. When the mother's diet is excellent during the first half of pregnancy but is low in protein or calories during the latter half, the young again lack intelligence. Similarly, if pregnant rats are fed an excellent diet during pregnancy but are given a low-protein diet while nursing, the brain is also permanently injured. Puppies whose mothers have been given a low-protein diet during pregnancy also have severe brain defects and a reduced number of brain cells. In every case, the damage is irreparable and the best possible diet later brings no improvement.

When pregnant and lactating rats are given diets only slightly deficient in protein for several generations, the young of each generation show progressively poorer brain development and slower learning ability. If their granddaughters and great-granddaughters are then given excellent diets throughout life, their young are still mentally retarded. The effects of faulty nutrition, therefore, cannot be overcome in a single generation, and what appears to be entirely a hereditary limitation is actually a nutritional one. Similarly, studies made 30 years ago of the diets of pregnant women in the United States showed them to be deficient in protein and many other nutrients. Humans, like the rats, may be unable to reach their intellectual potential in a single generation.

Protein deficiencies in human diets. The rapid brain development during the first three months after conception, thought to depend largely on protein synthesis, can be so limited by almost any deficiency that damage causing lifelong mental retardation can occur even at this early period. Deficiencies of high-quality protein and other nutrients cause the brain development of 70 per cent of the world's children to remain subnormal. Since the protein intake is usually higher, brain development is generally more normal when infants are nursed than when bottle-fed.

During World War II, large numbers of children born to women receiving daily while pregnant only 34 grams of protein and 1,145 calories were mentally retarded. Unfortunately, American women who could afford to eat anything they wished but whose children were born with subnormal intelligence were found to have diets as woefully inadequate both in protein and calories. Usually they ate no breakfast, and had white-bread toast, soft drinks, jelly sandwiches, and cookies during the day. Though dinner was often a well-planned meal, it could not supply enough protein, calcium, vitamin A, and other nutrients to allow a normal brain to be formed. The mothers of children with the lowest IQ's were those whose obstetricians had insisted that they drastically curtail calories to control their weight.

Even if a baby is born as bright as the proverbial dollar, the brain can be damaged by an inadequate diet at any time during the first four years and especially during the first six months. If a child's diet has been low only in calories, the brain remains normal though small, but if it has been deficient in complete proteins, the brain cells are decreased in number and show numerous abnormalities, especially when an inadequate diet is given to a young baby. The lower the protein intake, the more abnormal are the electroencephalograms and, at autopsy, the more damaged is the brain structure. One shudders to think of the number of normal infant brains which have degenerated as the protein of milk has been crowded out by canned baby foods.

The tragedy is that harm done can never be undone. For example, when a battery of tests was given to children whose diets had been woefully inadequate during their first four years, they showed marked inferiority to well-fed youngsters. These mentally defective children were then given an excellent diet for a year, and all tests were repeated: there was no improvement whatsoever.

Vegetarians sometimes impose diets so seriously deficient in complete protein and vitamin B_{12} on their children that brain injury occurs.

Hot-weather appetites. A significantly large percentage of children conceived during extremely hot summers are mentally defective. Furthermore, the hotter the summers, the greater are the number of retarded children born the following winter, whereas the smartest children are conceived during cold weather or cool summers. A study of patients in mental hospitals also showed that persons conceived during cold weather had higher IQ's than individuals born during the winter. When the weather is so extremely hot that little tastes good except lemonade, chilled watermelon, and ice cream, diets become deficient in most nutrients but particularly in protein.

Many studies have shown that women poorly nourished prior to conception and during pregnancy gave birth to mentally defective children. It makes no difference whether the cause was hot weather, severe nausea, ignorance, or poverty; the result is the same.

Effect of vitamin A on brain development. If animals are severely deficient in vitamin A before breeding, 100 per cent of the young will have greatly enlarged heads, with the brain cavity mostly filled with water (a hydrocephalic brain). A mild deficiency causes them to produce much less RNA than do normal animals; and increasing the vitamin A speeds up the synthesis of RNA more than does any other nutrient.

A lack of vitamin A in infancy and early childhood also causes irreversible mental damage; and children known to have been deficient in both protein and vitamin A during infancy are far more seriously retarded than youngsters lacking protein alone. Later tests show them to be especially low in intelligence and to have unusually small heads. Scientists making these tests say that a child's mental development can be accurately predicted if the adequacy of the diet during the first two years of life is known.

During infections, vitamin A is rapidly destroyed. Perhaps for this reason, any infection severe enough to slow down physical growth can inhibit brain development. In studies of groups of children who had had measles, chicken pox, mumps, meningitis, encephalitis, or other infections, the younger the child at the time of the illness, the greater was the brain damage, particularly in children under the age of three.

The B vitamins are vital. Deficiencies during pregnancy of almost any B vitamin can cause brain disorders in the young of animals. Vitamins B_1, B_2, B_6, B_{12}. and the B vitamins pantothenic acid and niacin amide each aid in building brain cells and releasing brain energy. Though a lack of folic acid, essential for the formation of both DNA and RNA, results in anemia, a deficiency far too mild to produce anemia causes irreparable mental retardation. When varying amounts of separate B vitamins have been given to many groups of pregnant rats, the ability of the young to learn maze running was in proportion to the quantity of each B vitamin allowed in the mother's diet; and an excess of some B vitamins increased such learning ability far above normal.

In humans, a deficiency of vitamin B_6 alone, extremely common during pregnancy, can cause severe mental retardation. Too little of any of the B vitamins is particularly harmful just before conception and/or during the first weeks of pregnancy. Totally aside from brain development, vitamin C and most of the B vitamins are essential to efficient brain function every day throughout life. During psychological testing, a lack of any one of these vitamins is said to decrease scores as much as 10 to 25 per cent below normal, but this fact is so little known that it is not taken into consideration in schools.

Vitamin E influences the brain. A form of drastic brain damage (encephalomalacia) sometimes seen in babies is said to be markedly similar to that produced experimentally by a lack of vitamin E. A toxic substance, MDA, formed in the tissues in the absence of vitamin E (p. 200), prevents DNA from reproducing itself, thereby stopping all cell division and the synthesis of body protein in the brain as well as elsewhere. Because an undersupply of vitamin E increases the need for oxygen (p. 62) and results in oxygen deprivation, it can damage a child's intelligence; and, conversely, vitamin E helps to decrease brain damage resulting from difficult labor. Furthermore, 44 per cent of blue babies, who suffer from oxygen starvation, have been found to be mentally subnormal, a condition which can sometimes be prevented when vitamin E decreases the need for oxygen. If a developing infant is deprived of oxygen at any time during pregnancy, even for one minute, the brain is said to be damaged; and a lack of oxygen at birth frequently does irreparable harm to the brain, a condition undoubtedly intensified by a vitamin-E deficiency. Some obstetricians are convinced that brain hemorrhage in newborn infants can be reduced by giving 300 units of the vitamin just before delivery.

When huge amounts of vitamin E have been given to mentally retarded children, such as mongoloids, long after the brain has reached maximum development, some improvement has occurred, presumably because the need for oxygen has been decreased.

Dr. R. Bayer, a German obstetrician famous for his research on vitamin E, states that of thousands of deliveries, he had never known a mentally retarded child to be born provided the father took vitamin E prior to conception. During later pregnancies, however, when the father omitted the vitamin, several mentally subnormal children were born.

Babies born prematurely, a condition often caused by a lack of vitamin E, frequently show marked underdevelopment of the brain; and a large percentage are mentally retarded, become autistic, or suffer cerebral palsy. The lower the birth weight of these tiny infants, the more severely damaged the brain is found to be. Certainly not all such children, however, are inferior intellectually.

The influence of minerals. All maternal malnutrition is now known to retard mental development in infants, though the effect of mineral deficiencies has not been thoroughly investigated. A severe lack of iodine during pregnancy can cause a mentally defective child known as a cretin to be born; before iodized salt was available, mental hospitals in the Great Lakes area were full of these tragic children. Youngsters with low blood calcium become mentally disturbed; and the serum bathing their brain cells drops so low in calcium that little RNA is released, causing learning to be difficult and memory faulty, though electroencephalograms show improved brain function soon after calcium is given. Magnesium, essential before body protein can be formed, is vital to an infant's brain development, and a deficiency, particularly if combined with a lack of vitamin B_6, can cause mental retardation in the newborn.

If the diet of pregnant rats is lacking zinc, a mineral deficient in most American soils, neither DNA nor RNA can be produced, and the brains of the young are severely damaged. Conversely, giving zinc to zinc-deficient animals markedly increases the quantity of both DNA and RNA.

When a fluid low in calcium is injected into the brains of rats, RNA production decreases within half an hour. Mental retardation in their young can also be produced by keeping female rats on an iron-deficient diet. Future research will probably show many more such relationships.

The significance of head circumference. When children have been malnourished during babyhood, their head circumference remains markedly smaller than normal, indicating brain damage and decreased brain size. There is simply no room for a well-developed brain in such a skull, yet the brains of these children contain far more fluid than do those of normal youngsters. Furthermore, research proves that the smaller the head size, the lower is the IQ.

By the time a child is three years old, his normal head size is 90 per cent that of an adult. If growth has not occurred by this age, there is little or no chance of recovery.

Inborn errors of metabolism. There is a rapidly increasing group of diseases in which an infant's brain is normal at birth but, because he lacks enzymes necessary to utilize some particular amino acid, his brain can seriously deteriorate within days. Such diseases, of which the best known is phenylketonuria, are detected by the odor of the baby's breath and urine. These odors, each characteristic of a different disease, are described as musty, smelling like maple syrup, sweaty feet, a brewery, fish, rancid butter, or rotten cabbage.

Any mother detecting such an odor should consult her physician immediately; if the offending amino acid is withdrawn from the diet quickly enough, brain damage can largely be prevented. When children with these diseases grow up and reproduce, however, their babies are usually monstrosities with gross brain abnormalities.

Nutrition and later intelligence. Children who have been deficient in protein or calories before the age of three invariably have low scores on intelligence tests. In one study where malnourished children were given a good diet before they were two years old, however, tests given later showed their IQ's to be 18 points above those of children whose diets had not been improved.

Though an inadequate diet during babyhood causes permanently decreased intelligence, the nutrition continues to affect IQ's later in life. In one study of 500 school children from low-income families, half were given milk daily for a ten-year period whereas the other half remained severely malnourished. At the end of this period, testing showed that only 3 per cent of the milk-supplemented group had IQ's below 80, compared to 40 per cent of the children not receiving milk. The mothers of these children were themselves so severely malnourished that three-fourths of them had IQ's of less than 75. With such a heredity, one would expect their children to remain persistently subnormal, yet when milk was allowed them, 97 per cent showed intelligence within the normal range.

Children having normal levels of vitamin C in the blood have higher IQ values than youngsters with low blood vitamin C; and when vitamin C is given to individuals deficient in it, their mental ability tests increase slightly (3.6 IQ units).

The genetic potential is not reached. Large numbers of mentally retarded infants are being born daily in the United States to women lacking neither education nor money. Thousands more have IQ's within the normal range but are still far less intelligent than they should be; they have short attention spans, delayed language ability, poor social adjustment, and numerous problems related to inadequate brain development.

Vast improvement might be brought about with little effort. If young animals are given a diet supplying far above normal amounts of essential nutrients from birth on, cell division in the brain is markedly increased over that of littermates kept on an apparently adequate diet. In several studies where a vitamin supplement has been given to mothers during pregnancy and lactation, their children, tested about the age of four, had significantly higher intelligence than youngsters whose mothers received no supplements. Similarly, when newborn infants, given an excellent diet and vitamin supplements during their first year, were tested later, their IQ's were 22.6 points above those of children the same age who had been poorly nourished during babyhood.

If parents would make every effort to keep their nutrition adequate, the children born in the future could undoubtedly be more highly intelligent and more nearly reach their genetic potential than is common today.

CHAPTER FIVE

Those Abnormalities Can Be Avoided

Catherine had just come from a class on childbirth education when I chanced to see her. She had been in radiant health throughout pregnancy and was intolerant with anyone not turned on to nutrition. "It would make you sick to see those girls, Adelle," she declared. "They're droopy, listless, have blotchy skin and varicose veins. Most of 'em live on tranquilizers and water pills and then complain endlessly about their exhaustion, hemorrhoids, leg cramps, stretch marks—you name it, they've got it. They think I'm crazy when I say nutrition could help them."

The women Catherine referred to could well afford the nutrients to keep themselves healthy, but they were so uninformed that they had no idea that nutrition could help them feel better, have an easier delivery, and give birth to a superior child.

For years three busy obstetricians referred all of their patients to me. Though many of these women had the abnormalities discussed in this chapter, they usually cleared up in two or three weeks.

Vitamin B_6 is a friend indeed. The need for vitamin B_6, or pyridoxin, increases immediately after conception; and most of the illnesses occurring during pregnancy can be prevented or corrected by this vitamin. In fact, volunteers who have stayed on a diet adequate in other respects but lacking in vitamin B_6 quickly developed nausea and vomiting, halitosis, headaches, and dry, scaly skin, especially around the anus and genitalia. They soon suffered from abdominal pain, burning, and intestinal cramps; leg aches and cramping of leg muscles, especially at night; nervousness; both sleepiness and insomnia; and they passed quantities of foul-smelling gas. They became dizzy, irritable, and quarrelsome, had "showers of dandruff," and found it difficult to concentrate. In time they developed hemorrhoids, anemia, and lowered resistance to infections. All of these symptoms disappeared within two weeks after adequate amounts of vitamin B_6 were given them. Almost every pregnant woman suffers from one or more of these symptoms. Furthermore, if the deficiency is allowed to continue, it can cause mental retardation, convulsions, and anemia in your newborn baby. Though this vitamin is found in yeast, liver, and wheat germ, a deficiency often becomes severe before such foods can be increased.

When vitamin B_6 is undersupplied, an amino acid from protein cannot be utilized normally; instead, it is converted into a substance known as xanthurenic acid, which is excreted in the urine. The more of this acid excreted, the more severe is the vitamin-B_6 deficiency. Urine tests have shown that 95 per cent of all pregnant women are deficient in this vitamin. When 25 milligrams of vitamin B_6 have been given daily to pregnant women, all xanthurenic acid promptly disappeared from the urine, showing that the deficiency had been overcome; it quickly recurs, however, if the vitamin is discontinued. Women given 10 milligrams of vitamin B_6 before conception and throughout pregnancy have shown no signs of a deficiency; but 2.5 milligrams, the maximum amount supplied by multivitamin supplements designed for pregnant women, were found to have "no significant influence."

Vitamin B_6 is needed in proportion to the amount of protein eaten. The more protein you consume, the greater will be your need for vitamin B_6. Since protein cannot be used normally without this vitamin, however, a deficiency of vitamin B_6 can actually cause the equivalent of a protein deficiency even when a generous amount of protein is eaten.

Nausea and vomiting. Totally aside from relieving your own distress, nausea and vomiting should be prevented or at least stopped at all possible speed. Poor nutrition at this time can seriously damage your baby's brain (ch. 4).

For the past 30 years vitamin B_6 has been used successfully in relieving the nausea and vomiting of pregnancy. Though nausea can be prevented by as little as 10 milligrams daily, 25 milligrams per meal is often needed to stop it. When vomiting has once started, 250 milligrams or more daily are usually necessary. If vomiting has become severe, physicians have often given injections of 300 milligrams or more daily. The vitamin-B_6 requirement varies widely with individuals, but as much as 600 milligrams have been given daily for weeks with no toxic effects.

The reason nausea and vomiting are worse in early morning is that, after hours without food, the blood sugar is usually low. To prevent this drop in blood sugar, eat some protein with a little natural starch or sugar immediately before retiring: fortified milk or cheese with fruit or juice; and until the nausea is over, eat again before getting up.

If nausea is already a problem, take 10 or 25 milligrams of vitamin B_6 every hour or two for a day or longer; and eat tiny amounts of some food which supplies protein with natural starch or sugar approximately every half hour: a few sips of eggnog sweetened with honey, or bites of a chicken sandwich on whole-wheat bread. Strictly avoid coffee, sweets, and every type of refined food.

For a few days after the nausea stops, continue to eat small amounts every two hours, nibbling breakfast through the morning, lunch through the afternoon, and dinner through the evening.

Threatened miscarriage. If you show spotting or have other symptoms of a threatened miscarriage, call your physician immediately. The best of nutrition will not necessarily prevent disaster. In many studies involving several hundred women with threatened miscarriage, however, 90 per cent have carried through normal pregnancies when vitamin E, or d-alpha tocopherol acetate, was started immediately, the amounts ranging from 30 to 200 units after each meal. Threatened or actual miscarriages frequently occur soon after physicians give iron supplements. Iron destroys vitamin E. Fifty years ago vitamin-E deficiencies were produced by adding iron salts in the diet, but, alas, knowledge gained is often not applied.

Oral antibiotics taken during early pregnancy can cause a miscarriage. These drugs destroy the intestinal bacteria which synthesize vitamin K, thus producing a deficiency which results in hemorrhage in the placenta. Similarly, such hemorrhages occur when a lack of vitamin C and bioflavonoids allows the walls of capillaries to break. Women who have suffered from multiple miscarriages have carried through successful pregnancies when these nutrients have been added to their diets. Starvation diets can also bring on miscarriage, but increasing the calorie intake after spotting has occurred rarely saves the infant. Because a miscarriage may be nature's way of getting rid of an imperfect embryo, some physicians believe no attempt should be made to prolong the pregnancy.

Nervous tension, insomnia, and leg cramps. Though too little calcium is a usual cause, a deficiency of vitamin B_6 alone can induce nervousness, insomnia, and muscle cramps. One physician reports that he has known women to scream from the pain of leg cramps, yet be comfortable within minutes after an injection of vitamin B_6 was given them. When 50 milligrams of this vitamim were taken daily, he found that such cramps disappeared within a few days. Cramps are usually worse at night, when slowed circulation brings fewer nutrients to the tissues. They can often be prevented if a glass of fortified milk is taken before retiring with 10 to 25 milligrams of vitamin B_6 and 2 or 3 tablets of calcium and magnesium combined. Should wakefulness persist or cramps occur, more vitamin B_6 and calcium-magnesium tablets can be taken.

Calcium, magnesium, and vitamin B_6 are also important in maintaining relaxation throughout the day. Calcium, however, is not well absorbed unless taken with vitamin D.

Let good nutrition be your tranquilizer. Even though it is known that tranquilizers can be extremely dangerous to expectant mothers and infants alike, they are still being prescribed for pregnant women. Tranquilizers are not needed when the diet is adequate. The symptoms for which they are given often subside the very day magnesium is added to the diet. Irritability, nervousness, jumpiness, trembling, and especially sensitivity to noise should be immediately recognized as indicating a probable need for more magnesium. When diuretics are taken or the weather is hot and magnesium is lost in perspiration, the deficiency can become so severe that mental depression, muscle weakness, and convulsions may occur.

The need for magnesium is increased by a diet high in protein or calcium or excessive in phosphorus. The requirement, which increases during pregnancy, appears to be approximately 5 milligrams per pound of ideal body weight. If before pregnancy you weighed 130 pounds, then you would need 650 milligrams of magnesium daily.

Headaches. Frequently headaches disappear soon after 25 milligrams of vitamin B_6 have been taken with each meal. Often increasing calcium and magnesium stops them. Headaches present on wakening are usually caused by low blood sugar, which drops during the night when no food is taken (p. 52). As long as headaches persist, one should eat daily 6 small meals, each supplying 15 grams of protein; and supplement the diet with vitamin B_6, magnesium, and calcium. When early-morning headaches are severe, it often helps to keep food by the bed to eat during the night.

Constipation and diarrhea. The definition of constipation is a hard stool, not an infrequent one. It can be caused by a lack of B vitamins necessary for energy production; hence the best sources of these vitamins—yeast, liver, and wheat germ—are all laxative. Magnesium is so laxative that it is sometimes difficult to obtain adequate amounts without making the stools too liquid; Epsom salts is magnesium sulfate. A half cup of yogurt or a tablespoon of acidophilus culture taken at each meal makes the stool particularly soft. Because constipation can result from a lack of potassium, perhaps induced by stress or too high a salt consumption (p. 242), fresh fruits and green leafy vegetables rich in potassium are often laxative.

Laxatives and cathartics interfere with digestion and absorption, dehydrate the tissues, and irritate the intestinal lining; hence they should be avoided. Mineral oil used as a laxative can produce severe vitamin deficiencies by dissolving carotene and vitamins A, D, E, and K from the blood and tissues and causing them to be excreted in the feces. Enemas, which are usually far from sterile, wash away protective mucus and may break tiny muscles in the rectum. None of these means of overcoming constipation is necessary because it is corrected as soon as the diet becomes adequate.

Diarrhea, or unformed stools, is frequently caused by emotional problems. It may result from a lack of the B vitamin niacinamide, and is often corrected when 100 milligrams of this vitamin are taken at each meal.

If diarrhea is severe, food is so incompletely digested and absorbed that multiple deficiencies can quickly occur. For this reason all supplements should be taken in greater than usual quantities. Large frequent meals containing a tablespoon or more of vegetable oil have been found to increase the retention of nutrients.

Hemorrhoids. Tissues from the rectum, or last part of the large intestine, pushed through the anus, are known as hemorrhoids, and they have been produced in volunteers deficient in vitamin B_6. Though I have seen no further research on this subject, I have recommended that several dozen persons having this painful abnormality take 25 milligrams of vitamin B_6 at each meal for a few days. All except one have told me that their hemorrhoids completely disappeared. Once the condition is corrected, 10 milligrams of vitamin B_6 at each meal have prevented a recurrence.

Neuritis. Pain, numbness, the prickling needles-and-pins sensation, and hands and feet "going to sleep" characterize neuritis, particularly common during pregnancy. Often a woman will appear to be awkward, dropping glasses and dishes, and she may find it difficult or impossible to sew or handle small objects. Physicians have usually treated neuritis with injections of vitamin B_1, which sometimes brings immediate relief. More recently, 50 milligrams of vitamin B_6 given at each meal to 120 pregnant women have stopped these symptoms as well as trembling, foot and leg cramps, and Charley horses. Other persons improve remarkably when pantothenic acid is added to the diet. Research has consistently shown, however, that neuritis is most quickly relieved when foods rich in all the B vitamins are eaten in addition to taking supplements.

Fatigue. When the diet is truly adequate, an almost unbelievable amount of work can be done without fatigue. For years I have found that when I take 2 tablespoons of yeast in fortified milk (p. 101) in the morning, I can work for hours without the slightest feeling of tiredness; if I skip the yeast drink, I start to drag in two hours or so.

There are many causes of fatigue. The most common perhaps is low blood sugar (p. 52). Fatigue which persists throughout the day is often caused by anemia (ch. 7). Early-morning exhaustion usually indicates low blood pressure and adrenal exhaustion (p. 110). Though each of these abnormalities is discussed later, persons having low blood sugar, anemia, and/or adrenal exhaustion can often achieve health within two weeks after having fresh liver and yeast daily or living on the antistress program (p. 110).

Flatulence and gas pain. In dozens of experiments volunteers have stayed on diets lacking one or another of the B vitamins; invariably distention and gas pain have been produced. Persons deficient in pantothenic acid alone suffered from severe stomach and abdominal burning and distress; they showed a marked reduction in stomach acid, digestive enzymes, and movement of the intestinal tract, all essential before food can be well digested and absorbed into the blood. Individuals obtaining too little vitamin B_6 have indigestion and a foul odor to both their breath and gas passed rectally. A decrease in digestive juices and enzymes also results from deficiencies of vitamins B_1 B_2 and niacinamide.

When the B vitamins have been so deficient that the body is unable to produce the normal amounts of digestive enzymes and juices, gas comes from the bacterial fermentation of undigested food. The condition indicates a dire need for foods rich in the B vitamins, but if large amounts of yeast, liver, or wheat germ are suddenly added to the diet, they are incompletely digested; because they are such excellent foods, the portion not digested can support the growth of far more bacteria than could less nutritious foods, and the gas becomes worse. When digestion is faulty, it is better to start by taking yogurt and/or acidophilus culture at each meal to destroy the gas-forming bacteria and introduce valuable ones into the intestine. Tablets of B vitamins can be taken at each meal. If gas has been severe, tablets of digestive enzymes, used temporarily, can pinch-hit for the enzymes you should have produced. Such small amounts as a tablespoon of wheat germ or a teaspoon of yeast can be taken daily until the deficiencies are overcome. Studies with volunteers show that digestion is usually normal within a month after the missing nutrients have been added to the diet. Liver damage caused by taking drugs, however, is said to be responsible for much of the indigestion so common today.

When one talks and eats, especially if either is done rapidly, air from the back of the throat is forced into the stomach, expands as it heats to body temperature, and causes flatulence and often gas pain. This gas may travel the 28 feet of the intestinal tract before it can be expelled. Because swallowed air, when passed rectally, has no offensive odor, it can be distinguished from gas released during the fermentation of undigested food. If the diet is made adequate, especially in calcium, magnesium, vitamin D, and all the B vitamins, the air-swallower relaxes and, because he is less nervous, swallows less air. Swallowing air can be prevented by eating slowly and sipping all cold liquids through a straw.

Low blood pressure. Soon after conception, the placenta, a pancakelike mass, forms in the uterus. It is here that the mother's tiny blood vessels, or capillaries, lie next to those of the infant, thus establishing nutritional communication between mother and child. The blood pressure, or force exerted against the walls of the capillaries, pushes all nutrients and oxygen into the mother's tissues and through the placenta, where they pass into the infant's blood stream. If the blood pressure is low, too few nutrients and/or too little oxygen can be driven into the placenta, and one cannot hope to have a superior child. Furthermore, the lack of nutrients reaching the mother's tissues causes fatigue to be so persistent that it is difficult for her to follow a good nutrition program.

If your blood pressure is below normal, for your child's sake stay on the antistress diet (p. 110) for at least three weeks. In all probability, your blood pressure will then be normal and your energy tremendously increased.

Hypoglycemia, or low blood sugar. The symptoms of hypoglycemia, which means too little sugar in the blood, include lassitude, fatigue or exhaustion, nervousness, irritability, mental depression, weakness, faintness, dizziness, headaches, heart palpitation, and inability to concentrate. If the adrenals are healthy, these symptoms can be completely prevented by avoiding sweets, refined foods, and stimulants; and by eating daily 6 small meals, each supplying 10 to 15 grams of protein. Because hypoglycemia affects almost every person, it should be so thoroughly understood that anyone can prevent it who wishes to.

When foods are digested, all starch and the more complex sugars are changed into the simple sugar glucose. As the amounts of glucose entering the blood increase, the pancreas produces insulin, which aids the cells in withdrawing some of this sugar and storing it in the form of starch, or glycogen; thus is glucose prevented from being lost in the urine. At all times, however, the cells must continuously be supplied with glucose from the blood to use in producing energy and heat. When no glucose is entering the blood from the digestive tract, the body starch, glycogen, is changed back into glucose and released into the blood as it is needed.

The cells, however, can store only a limited amount of glycogen. When more starches and sugars (carbohydrates) are eaten than can be used immediately or stored as glycogen, the excess—as everyone knows only too well—is laid down as fat.

There are essentially three causes of hypoglycemia. The simplest results from a failure to eat for several hours, as during the night or when one misses a meal. The amount of stored body starch is used up, causing the blood sugar to decrease. Energy, however, is not produced efficiently from fat alone. The brain of mother and infant alike can obtain energy only from sugar. Hormones from healthy adrenal glands, however, cause body proteins to be broken into fat and sugar; the blood sugar can again rise; and the amount of glycogen stored in the liver may increase as much as 600 per cent. In this case, the fatigue, or lag in energy production, is only temporary, and can be immediately corrected or prevented by eating frequent small meals.

The second cause of hypoglycemia is the excessive eating of sweets and refined starches. In this case, so much sugar from the digestive tract pours into the blood that it overstimulates the production of insulin necessary to aid this excess in being stored as gylcogen or fat. Simply because the pancreas is efficient, such quantities of insulin are released that the cells withdraw too much sugar from the blood, and the symptoms of hypoglycemia quickly occur.

Coffee, cigarettes, and many appetite-depressing drugs temporarily cause an increase in blood sugar, but it is quickly followed by a decrease. These substances stimulate the release of adrenalin, which causes body tissues to be broken down into sugar and fat. Again too much insulin is soon produced, and the blood sugar falls to a low level. The remedy is obvious.

The third and most serious form of hypoglycemia results from adrenal exhaustion, in which these glands can no longer produce hormones needed to help store glycogen, to change already stored glycogen back to glucose, and/or to convert body tissue to sugar and fat. The blood sugar can drop to such low levels that fainting spells—blackouts—and convulsions can occur to a mother; and the brain of the unborn infant can be seriously damaged. In this case, health should be rebuilt at all possible speed by strict adherence to the antistress program for several weeks (p. 110).

"Pregnancy cap." The ugly grayish-brown pigmentation so often seen on the forehead, cheeks, and neck of pregnant women (and those taking oral contraceptives) is spoken of as "pregnancy cap." It has been produced in volunteers made deficient in the B vitamin folic acid. The folic-acid-deficiency symptom physicians most frequently recognize is a specific type of anemia, but "pregnancy cap" appears long before the anemia is produced. When 5 milligrams of folic acid have been given at each meal to women having this ugly pigmentation, the skin usually becomes normal in two or three weeks and the anemia, when present, has been corrected. Several times I have obtained 5-milligram tablets of folic acid from a veterinarian for friends with "pregnancy cap"; on each occasion their skin has promptly become normal.

Severe exhaustion of the tiny glands above the kidneys, the adrenals, is also characterized by a brown pigmentation, particularly on the face. It is usually accompanied by low blood pressure and low sugar. This pigmentation, however, disappears as soon as the adrenal glands are restored to health.

Prevent those stretch marks. If the diet is inadequate during pregnancy, unsightly stretch marks usually appear on the breasts, abdomen, and hips. Healthy tissues are elastic; stretch marks are scar tissue formed wherever normal elasticity is lacking. Girls who allow themselves to gain little often have unsightly stretch marks because their diets have been so inadequate. Conversely, I know several girls (one carried large twins to full term) who, because they adhered to an unusually adequate diet, went through pregnancies without a single stretch mark. Such marks can more easily be prevented if tissues are not allowed to become waterlogged (ch.8).

Probably every nutrient helps to maintain the elasticity of healthy tissues; adequate protein and generous amounts of vitamin C are perhaps most important. Vitamin E, if generously supplied, can help prevent scarring. When all nutrients are obtained and 200 units of vitamin E or more are taken at each meal, stretch marks are rarely present and those already formed tend to disappear. Unless such elasticity is maintained, one can scarcely expect the tissues of the vagina to stretch sufficiently to allow an easy delivery.

Maintain normal blood cholesterol. During the last three months of pregnancy the blood cholesterol often becomes excessively high. This fatlike substance is deposited in the walls of the blood vessels—a condition conducive to heart attacks—and can interfere with your circulation and presumably that of your developing infant. To keep cholesterol in such small particles that it can pass readily into the tissues and be utilized, it is essential to obtain ample amounts of five nutrients: magnesium; linoleic acid from vegetable oils; and the three B vitamins cholin, inositol, and vitamin B_6 all of which are usually lacking from the prenatal supplements recommended by obstetricians. Solid fats, such as beef, lamb, and pork fat, coconut "oil," and fats to which hydrogen has been added—hydrogenated peanut butter, processed cheeses, margarine, and solid cooking fats—increase the need for cholin so much that they cause the blood cholesterol to rise.

If your blood cholesterol is over 180 milligrams in approximately a half cup of blood, avoid all hydrogenated fats and foods containing coconut fat, such as imitation cream; keep solid animal fats to a minimum; and have at least 1 or 2 tablespoons of vegetable oil daily, regardless of your weight. Cholin and inositol can be obtained by taking at each meal 1 or 2 tablespoons of soy lecithin stirred into milk or buttermilk; it is sold at health-food stores. I personally prefer to get these vitamins by taking 2 B-complex tablets after each meal; collectively they supply vitamin B_6 and 1,000 milligrams of both cholin and inositol. Of all nutrients, magnesium appears to be most important as a cholesterol-lowering agent.

Problems with the teeth and gums. Rampant tooth decay and bleeding gums, both common problems during pregnancy, indicate multiple deficiencies. Though eating too many sweets is the major cause of decay, especially when calcium and vitamin D are inadequate, almost every type of experimental animal has rampant tooth decay when the diet is deficient in vitamin B_6. Of a large group of pregnant women receiving 20 milligrams of this nutrient daily, more than half had no cavities, whereas most of a similar group not given vitamin B_6 had rampant decay.

A lack of vitamin C, the B vitamin niacin amide, or high-quality protein allows the gums to bleed easily and to become susceptible to infection. A diet high in calcium, protein, vitamins C and D, and especially magnesium helps to prevent the loosening of teeth and the loss of bone around the teeth. Canker sores may occur if vitamin C or niacin amide is undersupplied; and Vincent's disease, or trench mouth, has been corrected when 100 milligrams of niacin amide have been taken at each meal. Though advocates of fluoridation claim that it will prevent decay, when the diet is inadequate rampant tooth decay has occurred in spite of the fluoride intake being high.

Your diet during pregnancy appears to determine the size of your baby's teeth, the time of eruption, their susceptibility to decay, and the shape of the jaw at birth. A protein deficiency during pregnancy causes the teeth to be smaller, to erupt late, and to be susceptible to decay. The less calcium and vitamin D obtained by the mother, or the more excessive the phosphorus intake (p. 173), the greater the number of cavities in the child's teeth later. A lack of vitamin A interferes with the formation of the enamel, whereas taking certain antibiotics or obtaining an excess of fluoride can cause the baby's teeth to become pigmented.

The reward. The problems discussed in this chapter can usually be promptly corrected by the application of sound nutrition. By correcting them, far more serious problems are being prevented.

CHAPTER SIX

Keep Your Legs Beautiful

Several problems common during pregnancy cause so much suffering that I feel they should be dealt with in detail. Knowing Grace has convinced me that varicose veins is one of them. By the end of her first pregnancy, when she was still in her teens, varicose veins had become so unsightly she had had them stripped, or removed. During the past forty years, she has had other ugly varicose veins taken out. For years elastic stockings have covered her swollen, purple legs, yet every step has been painful; now she can scarcely walk at all.

In contrast, I think of Suzanne, whose varicose veins first appeared early in her third pregnancy. "My legs didn't hurt except when I played tennis," she told me, "but they were so repulsive to look at, they made me feel sick. I used to have pretty legs." During her seventh month an egg-sized purple clot formed on the inside of one knee which became painfully inflamed. She was put to bed while her mother came to look after the children. "My doctor wanted to take my baby then, but I wouldn't let him," she told me later. "We settled for surgery afterward. But he said I'd never play tennis again." At this point her diet had been improved. "You could scarcely believe your eyes," Suzanne and her mother both told me, using almost the same words. "The swelling went down like air going out of a balloon. There's nothing but a tiny blue line left where the worst varicose vein used to be." Suzanne was back on the tennis court the day her baby was a week old. And her legs are once again beautiful.

It is sad indeed that more than a tenth of all pregnant women get varicose veins before the birth of their first babies, yet few had them before conception. Many of these girls have had beautiful legs which thus get marred for life and become uglier with each successive pregnancy.

What is a varicose vein? Medical schools teach that varicose veins are caused by defective valves and are complicated by the pressure of the enlarged uterus on the veins of the abdomen. Scientists, however, have shown that varicose veins occur when a clot forms in the vein and blocks the passage of blood. Usually the clot attaches itself with claws like fishhooks to the blood-vessel wall, causing it to become irritated, swollen, and inflamed. The combination of swollen walls and clot frequently plugs the vein so completely that no blood can flow through it.

In the center of the leg near the long bone is a large vein which carries almost 90 per cent of the blood from your feet back to your heart; it is in this deep vein that a clot often forms. If it is blocked, the blood is forced to return to the heart by what have been small, invisible veins near the surface of the legs. The tremendous quantity of blood constantly pushing through these small veins causes them to become distended, blue, and ugly; in short, varicose veins have been formed. The situation is similar to blocking a major highway in which the traffic diverted into smaller parallel roads quickly causes them to be jammed.

Varicose veins produced experimentally. Spontaneous "varicose veins" have been observed in almost every type of experimental animal deficient in vitamin E even as long ago as 1931. Animals allowed vitamin E do not develop them. Furthermore, varicose veins have never been produced by any other nutritional deficiency. The cause appears to be that, in the absence of vitamin E, the essential fatty acids supplied by vegetable oils (p. 200) are quickly destroyed by oxygen. These fatty acids form part of the structure of every cell in the body; and the minute they are destroyed, cells break down. Because oxygen is particularly abundant in the blood, cells in the walls of the blood vessels—and the red blood cells carrying oxygen—break more readily than do cells in other parts of the body. Clots normally form wherever tissues are cut, mashed, or broken, and thus prevent hemorrhaging. The formation of the clot itself, therefore, is normal; only the breaking down of cells, which causes clots to form, is abnormal. This breakdown can be prevented by vitamin E.

Experimental varicose veins have been studied in the legs of chickens, rats, rabbits, and dogs on diets deficient in vitamin E. They invariably show that wherever a clot has formed or has lodged, the walls of the blood vessels become severely swollen and contain many dead cells and much scar tissue. It is the clot and swelling combined which cause the blood vessel to be blocked, the blood flow to be cut off, and the blood to be diverted into smaller parallel channels. If vitamin E is immediately given to these animals, the blood clot quickly dissolves; the blood vessel itself expands; the inflammation decreases or disappears; and a vast network of collateral blood vessels, which have been described as "a great arborization like branches of a tree," develops parallel to the obstructed blood vessel. Thus the blood is soon flowing in a normal manner. If vitamin E is not given, however, no new blood vessels are formed, and the clot dissolves slowly, if at all.

The varicose veins of pregnancy. Women who develop varicose veins or other problems which result from clotting usually have extremely little vitamin E in their blood; and their red blood cells are so rapidly destroyed by oxygen that they are usually anemic. Clotting and varicose veins are also particularly severe in women who have used oral contraceptives, which increase the need for vitamin E.

Though scientists have pointed out that experimental varicose veins have never been produced by a lack of any other nutrient, the animals they have used synthesize their own vitamin C. The fact that a lack of vitamin C allows the walls of the capillaries to break readily may indicate that it plays a causative role in clot formation and thus in varicose veins. When 200 to 600 milligrams of both vitamin C and citrus bioflavonoids (the white part of an orange ring supplies approximately 1,000 milligrams) were taken daily by 50 pregnant women whose varicose veins were red, swollen, and painful, 48 of them reported that the pain, swelling, and inflammation gradually disappeared and elastic stockings were no longer needed. Furthermore, not one of these women developed phlebitis.

Inflamed varicose veins, or phlebitis. Busy, overworked physicians are rarely concerned with ordinary varicose veins; they may even consider worry over them to be mere vanity. They have, however, made hundreds of studies of severely inflamed varicose veins, a condition known medically as thrombophlebitis. Thrombo- means a clot and phlebitis means inflammation of the vein resulting from the clot. Phlebitis often causes the entire leg to become red, feverish, swollen, and so painful that walking is impossible. Though it is common during pregnancy, it particularly occurs immediately after childbirth, especially if any tissue has been cut or broken.

As with the experimental animals, vitamin E has been found to reduce clotting in humans. In one study alone, 327 persons with phlebitis were given from 300 to 800 units of vitamin E daily; clots "melted away," pain disappeared, and the results were said to be "dramatic and gratifying." The sooner vitamin E is given, the more quickly the inflammation disappears. In many cases improvement was noticed within 12 to 24 hours after the vitamin was first swallowed. Another study concerned 100 women who had developed phlebitis at the time their babies were born. X-rays taken after a dye had been injected into their veins showed them to be completely obstructed. The women were then given 300 to 500 units of vitamin E daily. When the x-rays with the dye were repeated, they showed that the veins were open, that the inflammation had subsided, and that the blood was flowing normally. Persons who form clots readily and are susceptible to phlebitis have also been found to have abnormally small amounts of vitamin E in their blood.

In most research where there has been an attempt to prevent phlebitis, vitamin E has most usually been given to patients *after* surgery; even when given at such a late date, when compared to other patients not receiving the vitamin, few have had phlebitis, and whatever inflammation has occurred has been extremely mild. Many of the surgical patients not receiving vitamin E have developed clots, varicose veins, and often severe phlebitis. One should realize that phlebitis can become so acute that gangrene may set in, making amputation necessary.

Several physicians have stressed that it is virtually impossible to have either varicose veins or phlebitis if 400 to 600 units of vitamin E are taken daily; and all who have studied this subject appear to agree that women should be given vitamin E as a supplement throughout every pregnancy.

The amount of vitamin E needed. The vitamin-E requirement increases tremendously during pregnancy, which explains why varicose veins so often appear at this time and recur with each subsequent pregnancy. The quantity of vitamin E needed to prevent varicose veins is not known, however, and undoubtedly varies with different individuals. My friend Suzanne, mentioned earlier, improved none at all when she took 200 units of vitamin E daily, but cleared up rapidly after the vitamin was increased to 900 units each day. Investigators cited in this chapter have prevented clots throughout pregnancy or after surgery and have achieved excellent results with phlebitis by giving daily 300 to 500 units, or 600 units of vitamin E. A few physicians, giving 1,000 units or more daily after delivery, report that phlebitis has improved within hours. Others declare that abnormal clotting and associated problems are virtually unknown when 450 to 600 units of vitamin E are taken daily. Some women who have had phlebitis with each of several deliveries have had no problem when 300 units of vitamin E were taken daily throughout the later pregnancy. If a Caesarean is required, however, the amount of vitamin E needed daily appears to increase to 600 or more units. I have found only one report where as little as 200 units of vitamin E daily, given to surgical patients, appeared to have prevented phlebitis.

Vitamin E is certainly safer and is said to be more effective than the drugs now used to prevent clotting. If the blood pressure is high or if a woman has heart damage from rheumatic fever, however, only 100 units should be taken daily at first and the amount gradually increased.

Repeatedly investigators stress that at any time the vitamin is discontinued, clots can again form; that the vitamin E must be in the form of d-alpha tocopherol acetate; and that mixed tocopherols have no effect on varicose veins or phlebitis. They also emphasize that tying off or removing a varicose vein, though recommended by thousands of physicians, can be potentially dangerous and does not solve the problem. Other varicose veins usually form within 18 months. Furthermore, clots can form at any time, become detached, and cause still more serious problems.

The average daily intake of vitamin E in America ranges between 2.5 units and 14.5 units. This vitamin cannot be obtained from our overrefined foods.

Few obstetricians in the United States even recommend vitamin E or are aware that it could prevent varicose veins and phlebitis. Supplements planned specifically for pregnant women provide little or none of this vitamin. Such supplements do contain large amounts of iron, which destroys what little vitamin E may be available (p. 47). Even additional iron is often prescribed. I am convinced that this indiscriminate giving of iron produces not only thousands of cases of varicose veins and phlebitis but also innumerable miscarriages and premature births. If an iron supplement is essential, all the vitamin E should be taken at one time, as after breakfast, and all the iron eight to twelve hours later, as after dinner.

When phlebitis has already occurred. As important as vitamin E is, it should never be expected to carry the load alone. When phlebitis has once set in, the diet should be adequate in all respects and especially the antistress factors p. 110), in addition to 600 units or more of vitamin E daily. In some cases, however, 2,000 milligrams of vitamin C, taken every two or three hours around the clock, have quickly cleared up the inflammation.

Other advantages of obtaining vitamin E. A woman who develops varicose veins during one pregnancy and fails to improve her nutrition may expect them to become worse during following pregnancies, especially if she has taken oral contraceptives in the interim. Serious problems caused by abnormal clotting can occur, of course, at any time and to either sex. For example, an embolism, or clot which breaks away from the point where it was formed and lodges elsewhere in the body, can be fatal. Strokes and pulmonary embolisms, where clots have lodged in the brain or lungs, have caused the deaths of women using "the pill." A friend of mine suffered a pulmonary embolism which kept her hovering between life and death for ten days. She told me, "The pain at every breath was so horribly excruciating that I prayed to die. I still don't know how anyone can endure such pain." Yet scientists have repeatedly pointed out that if vitamin E is adequate, embolisms are nearly unheard of.

Aside from abnormal clotting, vitamin E protects the infant by reducing its need for oxygen; it helps to prevent mastitis, or inflammation of the breast; and it makes delivery easier p. 126). There are personal advantages aplenty in obtaining this vitamin daily during pregnancy.

Varicose veins of long standing. When varicose veins have formed many years ago, improved nutrition rarely seems to help them. I did meet a 65-year-old woman who had had acute phlebitis for a number of years; most of the time she had been bedridden. An adequate diet, 300 units of vitamin E after each meal, and approximately 1,000 milligrams of vitamin C every hour she was awake brought marked improvement. She held out her leg for me to see. "Look at that leg!" she exclaimed. "Not a sign of a varicose vein left. It hasn't been so beautiful since I was 16."

Occasionally they do disappear, but it is much easier to prevent them.

CHAPTER SEVEN

Anemia Destroys Your Vitality

Approximately two-thirds of American women are prevented from enjoying their pregnancies because of weakness, headaches, dizziness, palpitation, shortness of breath, and fatigue to the point of exhaustion, to say nothing of the pallid face and tired eyes haunting each one every time she passes a mirror. These symptoms, all of which can be caused by anemia, or the inability of your blood to carry sufficient oxygen, are bad enough for you to endure. The oxygen supply to your developing baby, however, is meager at best; an undersupply of oxygen is a major cause of brain damage in the fetus. Furthermore, when a mother is anemic, her baby develops anemia soon after birth. Fortunately, anemia can be both easily prevented and quickly corrected.

Anemia can result from having too few red blood cells or too little red coloring matter (hemoglobin) in the blood cells or a combination of both. To protect yourself and your baby, you should have about 14 grams of hemoglobin in approximately a half cup of blood; and your count of red cells should be 4½ to 5 million. Physicians classify anemias according to the size and shape of blood cells and whether they fail to mature or do mature but are easily destroyed.

Most obstetricians assume that the anemia so prevalent during pregnancy is caused by lack of iron, and they attempt to correct it by giving ever larger amounts of iron salts. Unfortunately, such anemia is rarely corrected by iron alone.

Protein-deficiency anemia. An anemia which does not clear up when iron is taken can be readily corrected by increasing the amount of protein in the diet. Such anemia results either when too little protein is eaten or when the proteins are of poor quality. For example, vegetarians frequently suffer from anemia because the proteins they obtain often lack essential amino acids, and also because they are usually deficient in vitamin B_{12}, needed to utilize protein. The red blood cells are made of protein containing all essential amino acids. Furthermore, adequate protein increases the "absorption of iron from food into the blood." Pregnant animals given too little protein or protein of poor quality are always anemic; simultaneously the protein deficiency causes the brains of their young to stop developing and remain too small.

If you are already anemic, count protein grams by using the tables in the back of this book. See that you get 80 to 100 grams daily, mostly from liver and other meats, eggs, yeast, and dairy products. Increasing the protein in the diet, however, increases the need for vitamin B_6.

Vitamin B_6-deficiency anemia. A deficiency of vitamin B_6 causes an anemia which cannot be distinguished from the anemia resulting from a lack of iron; and, though iron is invariably given in huge amounts for it, such anemia can become so severe that transfusions are necessary. This deficiency is probably responsible for more anemia during pregnancy than any other cause. Anemic pregnant women almost invariably show xanthurenic acid in their urine, proving that they are deficient in vitamin B_6 (p. 46); and by the time the anemia is corrected, this acid disappears, indicating that the anemia was not caused by an iron deficiency. Without vitamin B_6, protein cannot be utilized nor can red blood cells be produced.

Volunteers whose diets were adequate except for vitamin B_6 developed anemia which readily cleared up when the vitamin was given them. Similarly, when 50 to 200 milligrams of vitamin B_6 have been given daily to anemic pregnant women, red blood cells have been found to increase rapidly by the fourth day; and the red coloring matter, or hemoglobin, promptly rose from 8.5 to 13.1 grams. In most of these cases, so much iron had been given that the amount in the blood was four times the normal quantity, yet the severe anemia had persisted. Even after it had been corrected, the anemia quickly recurred if vitamin B_6 was discontinued.

Vitamin-E-deficiency anemia. Hundreds of studies have shown that a lack of vitamin E causes anemia. Such anemia has been produced in every type of experimental animal and in human volunteers merely by withholding vitamin E from the diet. Furthermore, hundreds of blood analyses show that individuals having little vitamin E in the blood are invariably anemic.

The walls of the red blood cells, like every cell in the body, are in part formed by essential fatty acids (p. 90); in the absence of vitamin E, these acids are destroyed by oxygen, allowing the blood cells to break down. In fact, scientists even test for a vitamin-E deficiency by observing how quickly the red blood cells break down when exposed to oxygen.

Healthy red blood cells have a life span of approximately 120 days; about 8 per cent of these cells are normally destroyed daily and new ones are produced. When vitamin E is lacking, however, such huge numbers of red blood cells are continuously being broken down that severe anemia results. Not only does vitamin E allow the walls of the red blood cells to remain so strong that the life span of these cells is increased, but it also increases iron absorption and hemoglobin production. Furthermore, the red blood cells which are produced in the bone marrow cannot be made without this vitamin; and biopsies of the bone marrow of anemic pregnant women usually show them to be deficient in vitamin E. If the diet is adequate in other respects, anemia resulting from a lack of this vitamin is corrected soon after it is added to the diet.

Many physicians who are untrained in nutrition are not aware that a vitamin-E deficiency can cause anemia. The usual blood analysis may show that too few red cells exist but not that they are being rapidly destroyed. Articles in medical journals have repeatedly pointed out that even when doctors report anemias caused by a decreased life span of red blood cells, they fail to associate this problem with a vitamin-E deficiency. The real tragedy is that the iron they prescribe destroys vitamin E (p. 94) and causes this anemia to become worse.

Vitamin E markedly decreases the need for oxygen. Since the symptoms of anemia occur because too little oxygen reaches the tissues, this vitamin can protect your developing infant from oxygen shortage and reduce your fatigue even though your anemia may be brought on by other deficiences.

Folic-acid-deficiency anemia. Another type of anemia, found to occur in a fifth of all pregnant women, has been produced in volunteers on a diet lacking the B vitamin folic acid. Such anemia, which becomes progressively worse as pregnancy advances, afflicts most of the women who develop toxemia (ch. 9) and 80 per cent of those carrying twins. Fatigue and the ugly "pregnancy cap" (p.

53) usually occur before the deficiency becomes severe enough to cause anemia. This vitamin is necessary for the synthesis of DNA and RNA (p. 30) and is therefore vital to brain development. Because a lack can result in hemorrhaging, miscarriage, premature labor (*abruptio placentae*), congenital defects, mental retardation, and infant deaths, when possible it should be given before conception, or at least to all women early in pregnancy. Women who have spontaneous abortions have been found to have abnormally small amounts of folic acid in their blood.

The American diet supplies only 0.35 milligram of folic acid daily; yet at least 1 milligram appears to be needed daily to prevent anemia during pregnancy. Though the bone marrow becomes abnormal when folic acid is deficient, it starts to produce new red blood cells within hours after this vitamin is given. The amounts required to correct anemia have varied from 2 to 5 milligrams taken with each meal. This quantity is 60 to 150 times more than our Food and Drug Administration allows to be sold without a prescription (p. 33). The small amount they do permit in supplements, or 0.1 milligram, is said not to prevent the anemia of pregnancy, much less correct it; and many supplements prepared especially for pregnant women contain no folic acid.

Our Food and Drug Administration, by restricting the sale of this nutrient, actually forces mothers to produce inferior children. Even the National Academy of Sciences —National Research Council recommends that a pregnant woman get 0.8 milligram of folic acid daily. When less than 1 milligram is obtained daily during pregnancy, many babies are born dead.

Several causes are usually overlooked. Anemia can result from the lack of any one of several nutrients not yet considered. For example, humans staying on diets supplying too little magnesium quickly develop anemia. This mineral is necessary before enzymes containing vitamin B_6 can help build red blood cells. Magnesium deficiencies are widespread in America, and the requirements are increased by pregnancy. A deficiency of copper, induced by the use of foods grown on chemically fertilized soils, also causes anemia. Humans undersupplied with zinc develop anemia; and giving zinc to anemic individuals has corrected the disease. Diets deficient in vitamin B_2 cause every type of experimental animal and human volunteers to become anemic. Even the lack of pantothenic acid or vitamin B_{12} prevents the production of healthy blood.

In all probability, most cases of anemia result from many deficiencies occurring simultaneously. When diets are deficient in iron, they have invariably been found to be low in folic acid, protein, and vitamins B_2, B_6, and B_{12}, the lack of any one of which could cause the anemia. Conversely, a diet adequate in all other nutrients is quite high in iron. If the diet furnishes too little of the B vitamins niacin amide, cholin, panthothenic acid, or vitamins B_1, B_2, or B_6, however, the stomach cannot produce the hydrochloric acid essential before iron can be absorbed; in these cases anemia occurs even though the intake of iron may be excessive. A lack of stomach acid, in turn, decreases the absorption of protein, vitamin C, and other nutrients also essential to the prevention of anemia.

Vitamin C is especially important in correcting anemia, which invariably occurs if this vitamin is undersupplied. When large amounts of vitamin C are obtained, iron absorption is increased so much that the anemia is usually corrected without being added to the diet. Iron absorption doubled after anemic women were given daily 500 milligrams of vitamin C. This vitamin also prevents anemia by reducing the requirement of folic acid, pantothenic acid, and vitamins B_2 and E.

Iron-deficiency anemia. True iron-deficiency anemia can be diagnosed only by determining the amount of iron in blood plasma, which should be 70 to 200 milligrams in approximately a half cup of blood. Ordinary blood analysis does not supply this information. Most of the symptoms associated with anemia occur because dozens of enzymes cannot function normally without iron, also needed by the bone marrow and muscle cells. Iron-deficiency anemia, however, does occur in anyone living largely on refined foods.

Aside from the mother's needs, about 600 milligrams of extra iron are required for each pregnancy, or about 2.2 milligrams daily. Ideally, this amount should be stored before each conception. During the last months of pregnancy, the infant stores enough iron to supply his needs for the first six months. A mother's iron intake, should, therefore, be particularly adequate during this period, especially if twins are expected. Though some iron from worn-out blood cells is excreted daily in the feces, most of it is used again and again. Only 5 to 10 milligrams of iron appear to be needed daily during pregnancy. To allow for faulty absorption, however, authorities recommend a "safety margin" of 18 to 30 milligrams, yet grant that an excess can be dangerous. Furthermore, the larger the amount of iron taken daily, the smaller the percentage absorbed. Obstetricians often give tablets supplying as much as 150 milligrams of iron each (p. 104); and dozens of young children, thinking that such tablets are candy, die annually from eating them.

Iron supplements can be dangerous. If the diet is deficient in magnesium, vitamin B_6, or cholin, as it often is during pregnancy, quantities of excess iron can be absorbed and stored in the tissues. The amount of iron in the blood may increase to eight times normal; and excess iron, deposited in the liver and tissues, damages them to such an extent that they become filled with scar tissue, which later calcifies. This condition appears to be identical to a disease, siderosis or hemosiderosis, which is often fatal to humans and unfortunately is no longer rare. If the diet is adequate, especially in vitamin B_6, however, excessive iron is never absorbed.

By destroying vitamin E, iron supplements can actually cause anemia. Fifty years ago, vitamin-E deficiencies were first produced in animals by adding iron salts to the diet, the same iron salts still being given women during pregnancy. Since that time, scientists wishing to study vitamin-E deficiencies have purposely added such iron to the diet of animals as the easiest method of producing vitamin-E deficiencies. Because vitamins A and C, carotene, the essential unsaturated fatty acids, and numerous hormones are all damaged by oxidation in the absence of vitamin E, the giving of iron compounds to pregnant women can have far-reaching and serious effects indeed. Furthermore, iron supplements increase the need for several nutrients, including pantothenic acid, vitamin C, and oxygen, so important to the developing infant. Scientists who have spent years doing research on vitamin E stress that iron compounds given during pregnancy can cause malformed or mentally defective infants or bring on miscarriages or premature births.

Some physicians are alarmed over the large amounts of iron now being given to pregnant women, and stress that folic acid, vitamin B_6, and other nutrients needed to prevent anemia are too often overlooked. Though physicians give iron salts because they are concerned about the widespread anemia, they probably would not do so if they were trained in nutrition. When groups of pregnant women have been given iron supplements and compared to similar groups receiving useless tablets, or placebos, the women receiving no iron salts have made the greatest improvement.

I feel strongly that no pregnant woman should use supplements purchased on prescription unless she knows their contents; such prescriptions often contain 150 milligrams of iron in the amount to be taken daily.

Occasionally I recommend mixed mineral tablets containing iron simply because I could find no dependable source of zinc, manganese, and other minerals without iron. In that case or if you feel it is necessary to use a supplement containing iron, take all the vitamin E at one time after breakfast, then take iron only after dinner, separating the two by ten hours or more.

Iron supplements are not needed. The iron obtained from food is never harmful. If you are willing to eat fresh liver once each day, perhaps have desiccated liver temporarily at other meals, and have eggs, yeast, and a green leafy vegetable daily, even severe anemia usually clears up in two or three weeks. No iron supplements are needed.

CHAPTER EIGHT

"Water Pills" Are Dangerous

During pregnancy it is common for fluids to be retained in the body, a condition known as edema. Like anemia, edema has many causes, but if the diet is adequate, it can be easily prevented or quickly corrected. Obstetricians usually attempt to solve this problem by giving drugs known as diuretics, which are dangerous to both mother and child. Unfortunately, these drugs are often called by the innocent-sounding name of "water pills," which itself denotes safety. A friend who is a pharmacist tells me that he is continually shocked at the number of prescriptions for diuretics he must fill for pregnant women; and that some obstetricians even give them as a "preventive measure" to every woman during pregnancy, a practice which is truly shocking. Since diuretics cause several pounds of water (laden with nutrients) to be excreted, weight-conscious American women readily cooperate without awareness that harm is being done.

Every woman should recognize the symptoms of edema. Puffiness becomes noticeable around the eyes, especially on rising. The hands gradually swell until rings no longer fit, and veins and ligaments may no longer be visible. At first the ankles swell only toward the end of the day but later may remain swollen. Weight usually increases five or more pounds.

The cause must be corrected. Under normal circumstances, a certain amount of a protein, albumin, is found in the blood. As the blood leaves the arteries and passes through the capillary beds, each heartbeat forces blood plasma into the tissues. Eventually almost nothing is left in the capillaries except red blood corpuscles and blood proteins. At this point the albumin serves its purpose by attracting back into the blood fluids from the cells carrying waste products. These waste products are then removed by the kidneys.

Before the body can maintain a normal amount of albumin in the blood, adequate protein of high quality must be eaten. If protein or even one amino acid, such as methionine, is supplied in too small a quantity, too little albumin can be formed, and the amount in the blood decreases. In this case, fluids containing waste products cannot be efficiently drawn into the blood; some remain in the tissues, the amount depending on the severity of the protein deficiency.

I recently saw a woman whose ankles were extremely swollen, although she was only in her fourth month of pregnancy. She was eating little protein and was not drinking milk because she feared she would gain too much. Within three days after she increased her protein intake, the swelling in her ankles disappeared. What pleased her even more was that the scales showed she had lost 6 pounds; such a loss meant that she had excreted some 3 quarts of liquid which had been held in her tissues.

Aside from needing protein to prevent edema, it is well to remember that when less than 85 grams of protein are obtained daily, babies are born in poor condition. Furthermore, an undersupply of protein can cause anemia, low blood pressure, susceptibility to infections, and allow your baby to become mentally retarded (ch. 4). For these reasons, solving the problem of edema by taking diuretics is fair neither to yourself nor to your infant.

Vitamin-B_6-deficiency edema. Regardless of the amount of protein eaten, body proteins cannot be produced unless vitamin B_6 is amply supplied. A lack of this vitamin, therefore, has the same effect as a protein deficiency itself. Because the liver can no longer synthesize albumin, urine collection becomes faulty and waste-laden fluids are left in the tissues.

One doctor reported his findings with pregnant women whose protein intake was adequate but who still had edema. When he gave 50 milligrams of vitamin B_6 at each meal, one woman lost 13 pounds in a single week, a second lost 11 pounds in two weeks, and a third 15 pounds in 18 days, yet without limiting salt or decreasing calorie intake. Such losses indicate that soon after vitamin B_6 was supplied, albumin could be produced and thus allow urine collection to proceed normally; hence quarts of waste-laden fluids were removed from the tissues. Several physicians have reported that when they have treated edema with vitamin B_6 shortly before delivery, not only have the women lost pounds, but also their babies have shown marked wrinkling, indicating that they too had been waterlogged but the excessive fluid had been excreted. Without this vitamin these infants would have been much larger and presumably far more difficult to deliver.

Pregnant women receiving vitamin B_6 have reported that their headaches, leg cramps, neuritis, and many other unpleasant symptoms also disappeared, all advantages which diuretics do not give.

Edema has other causes. A lack of any nutrient which interferes with the production of albumin or causes it to be lost through the kidneys or feces can cause edema. For example, even when the protein intake is adequate, if too few calories are eaten, the protein must be used for calories, or to supply heat and energy, and therefore is not available to build albumin. The effect is the same as if the diet were deficient in protein, and edema quickly occurs. Both zinc and vitamin E, like vitamin B_6, are necessary before albumin can be formed; hence a lack of either of these nutrients can cause edema. Large amounts of vitamin E have been particularly effective in correcting the edema of pregnancy. Even when enough albumin is formed, a diet deficient in cholin allows the kidneys to become so damaged that albumin is lost in the urine; thus severe edema is produced. Pregnant women who are anemic also lose much albumin in the feces. A diet high in refined foods and saturated, or solid, fats markedly increases edema, partly because the cholin requirement is increased.

All of these nutrients would be generously supplied in an adequate diet.

The effect of stress. Anything which puts an extra load on the body is defined as stress. Pregnancy itself is a stress. Poor nutrition, emotional upsets, pain, infections, allergies, exposure to extreme heat or cold, lack of sleep, the taking of drugs, and dozens of other factors all cause stress.

With the help of two tiny glands above the kidneys, known as the adrenals, the body reacts to every type of stress in the same way. Healthy adrenal glands produce large amounts of many hormones, such as cortisone, which help to mobilize nutrients needed to meet the demands of stress. Some hormones cause tissue proteins to be broken down to supply sugar and fat for immediate energy; others pull minerals from the bones; another, know as aldosterone, which controls urine production, holds salt (sodium) and water in the body, thus increasing the volume of blood and its pressure against the walls of the blood vessels. This increase in blood pressure helps to push into the tissues the nutrients needed to meet the stress. The retention of water, however, also causes edema. For example, when cortisone is given as a medication, so much fluid is usually held in the body that edema is severe, the face becomes moon-shaped, and a slender person appears to be fat.

The greater the number and severity of stresses, the more pounds of fluid held in the tissues and the worse the edema becomes. Severe edema indicates that stress has been so intense and/or the diet so inadequate that the adrenals are nearing exhaustion.

Stress, because it does put an extra load on the body, increases all nutritional requirements, especially for vitamin C and pantothenic acid. Conversely, the more adequate the diet, the less the entire body is damaged by stress. The adrenals themselves, however, cannot produce hormones unless the diet supplies vitamin A, B_1, B_2, B_6, C, and E, the B vitamins pantothenic acid and cholin, and the essential unsaturated fatty acids.

A lack of any one of these nutrients decreases the production of the urine-collecting adrenal hormone aldosterone, thus allowing too little urine to be formed and edema to occur. Conversely, when the diet has been adequate and large amounts of pantothenic acid were given to persons under stress, nutrients were available without body tissues being torn down to supply them; hence urine collection proceeded normally and no edema occurred. Of all nutrients, pantothenic acid appears to be the most important in stimulating the production of adrenal hormones.

Whenever edema already exists, if each of these nutrients can be given in amounts large enough to meet the needs of stress, urine production soon increases and the edema disappears. Only when the diet is inadequate does edema occur; and such a diet prevents your baby from becoming the superior child he has the right to be.

Certain nutrients have a diuretic action. Long ago it was found that large amounts of vitamin C increased urine production. More than one investigator has stated that this vitamin is even more effective than medicinal diuretics. When large amounts of vitamin C are being taken to ward off a cold or other infection, urine production is so stimulated that pounds of liquid are sometimes lost in a single day. One reason appears to be that vitamin C prolongs the effectiveness of cortisone and other adrenal hormones. Other investigators, however, have found that vitamin E is more effective than diuretics in stimulating urine production.

When salt should be avoided. It is well known that if salt is restricted, less water is held in the tissues. Limiting salt, however, does not correct the edema caused by obtaining too little protein or vitamin B_6 or other nutrients essential to the synthesis of body protein. I frequently find expectant mothers who are avoiding salt even though their obstetricians have not asked them to do so. Salt is sodium and chlorine, both essential to health. These nutrients are extremely important in keeping the body fluids neutral, or from becoming either acid or alkaline. As we have seen, sodium is essential in maintaining water balance in the body. Sodium and chlorine are both excreted daily in the urine, not in the form of table salt but in combination with waste products. For example, the sodium may be combined with uric acid as sodium urate, and chlorine with ammonia as ammonium chloride. During pregnancy, both acid and alkaline waste products from the fetus are also being thrown into the mother's blood, and her need for salt may be increased rather than decreased. Thus both sodium and chlorine supplied by salt are essential to life itself.

Experimental animals eat larger amounts of salt during pregnancy than at other times. A study was made in England of over 2,000 pregnant women, half of whom were told to eat more salt than usual, the remainder to eat less than usual. Unfortunately, blood pressures were not reported, but women who ate extra salt throughout pregnancy had fewer miscarriages, suffered less from muscle cramps, retained less water, and had less toxemia, premature births, and hemorrhaging, all of which is exactly opposite from the old belief that salt made most of these conditions worse.

On the other hand, if the adrenal glands are healthy, stress causes sodium to be held in the body; more than 99 per cent of all sodium filtering through healthy kidneys is reabsorbed into the blood. For this reason, when such multiple stresses as inadequate diet, fatigue, lack of sleep, perhaps allergies, infections, financial worries, and emotional problems cause excessive aldosterone and cortisone to be produced, the sodium from salt eaten accumulates in the body day after day, and severe edema can occur. Eating salt at such a time causes still more water to be retained and the edema to become progressively worse. If salt is avoided temporarily, however, the excessive sodium already in the body is gradually excreted with aldosterone, especially if the diet is adequate in vitamin D.

In case the multiple stresses continue and the diet remains inadequate the adrenal glands soon become exhausted. Because they can no longer produce sufficient aldosterone, too much sodium is lost from the body; the blood pressure becomes low; and salty foods must be eaten even though edema may exist from other causes.

Thus when edema is brought on by stress, the blood pressure becomes elevated. For this reason, the blood pressure can serve as a guide to the amount of salt needed in the diet. If the blood pressure is much above 120/80, salt should be restricted. The higher the blood pressure becomes, the more strictly should salt be limited. Conversely, low blood pressure indicates that the adrenals are exhausted and that salt (sodium) is being lost from the body; therefore, salty foods should be eaten temporarily at each meal. If the diet is improved and the blood pressure becomes normal, the amount of salt should be reduced. Excess salt, as we will see later, can be toxic (p. 82).

The danger of "water pills." A pregnant woman with edema is already suffering from multiple nutritional deficiencies which induced the condition. Although her diet should be improved at all possible speed, instead of such improvement most obstetricians merely give diuretics, or "water pills," which cause far more serious deficiencies. Potassium deficiencies alone, induced by the prolonged use of diuretics, have frequently caused death. Unfortunately, it is estimated that 2 million pregnant women take diuretics daily and that some 36 million prescriptions for diuretics are written annually. These drugs cause body fluids to be forced through the kidneys so rapidly that the nutrients carried in these fluids cannot be reabsorbed into the blood.

The potassium deficiency produced by taking diuretics causes listlessness, fatigue, mental depression, insomnia, constipation, general weakness, irregular heartbeat, and soft, flabby muscles unfit for an easy delivery. The kidneys are said to be particularly harmed by such loss of potassium; and some physicians believe that the kidney disease in infants, polycystitis, which can be fatal, is caused by a diuretic-induced potassium deficiency in the mother.

A deficiency of magnesium is also quickly produced by diuretics. This nutrient is essential in preventing edema because vitamin B_6 cannot be utilized without it and potassium cannot be retained in the body. Furthermore, its lack causes the woman taking diuretics to suffer from nervousness, tremors, jumpiness, sensitivity to noise, mental depression, and muscular weakness. At the same time the magnesium requirement is increased both by pregnancy and by stress.

Though all nutrients have not yet been studied individually, it now appears that diuretics can produce deficiencies of some 35 nutrients, or of any body requirement which dissolves in water. Diuretics thus cause deficiencies of vitamin C, the many B vitamins, iodine, zinc, and a variety of minerals; of all the amino acids from digested proteins; and even of sodium. Though kidney damage is the most common injury known to be caused by diuretics, diabetes has been brought on by "water pills" in patients with no family history of the disease. Diuretics also increase the clotting of blood, and multiply the chances of developing varicose veins, phlebitis, and embolisms (ch. 6). Because diuretics produce so many deficiencies, they can bring on toxemia and convulsions, and even contribute to the very loss of the baby or mother.

If one searched for a method by which a newborn infant would be robbed of its superiority, it would be difficult to find a more efficient means than by giving diuretics. Had obstetricians studied nutrition, I doubt that any would prescribe these vicious drugs.

Diuretics are not needed. When the diet is improved the moment rings become tight or puffiness is noticed around the eyes or ankles, edema is short-lived. Protein grams should be counted (p. 89) and 120 grams or more obtained daily; perhaps 25 milligrams of vitamin B_6 should be taken temporarily after each meal and the antistress program followed (p. 110). Your blood pressure can be a guide to the amount of salt required. Provided these steps are taken, you will have no need for diuretics, and your baby will be much healthier without these drugs.

CHAPTER NINE

Recognize the Storm Signals

"Some women won't follow a diet," Dr. Williams remarked to me one day.

Immediately I thought of Margaret; that had certainly been true of her. She was thrilled to be pregnant again but had refused to eat intelligently. More than once I had tried to get her to improve her diet.

"Phooey on that stuff," she would answer gaily. "I have two beautiful children, and I ate anything I wanted when I was pregnant with them. Of course I go to a lot of parties. Far be it from me to insult a hostess."

In her seventh month she developed toxemia. Her baby was born dead, and she was frightfully ill. If she and other pregnant women could know more about nutrition and recognize the danger warnings, this tragedy and thousands like it could be avoided.

The responsibility is yours. Usually the symptoms of toxemia seem insignificant to expectant mothers. To obstetricians—and a finer group of men I have yet to meet—these same symptoms cause dread and fear. Throughout your pregnancy, your obstetrician is on the lookout for these symptoms and tries to prevent them. It is for this reason he asks for a urine sample each month and checks your blood pressure and weight fluctuations so carefully.

It is now obvious, however, that toxemia develops only when multiple nutritional deficiencies exist. These deficiencies cause symptoms which, though they do seem insignificant at first, can change with lightning speed into dangerous ones. An expectant mother who recognizes nutritional deficiencies and knows how they can be overcome can take steps to prevent or correct them. Thus she and she alone can prevent toxemia and determine the health of her own baby. No doctor can do her eating for her.

In case you develop the danger warnings mentioned in this chapter, discuss them immediately with your obstetrician. Remember that the responsibility of correcting them, however, remains on your own shoulders.

The toxemia of pregnancy. Toxemia, which occurs in late pregnancy, is characterized by edema, high blood pressure, and loss of albumin in the urine. It can quickly develop into eclampsia, marked by a sudden onset of convulsions, which are often followed by coma and death. Toxemia still kills 30,000 infants per year; it is responsible for the majority of babies born dead, for approximately 50 per cent of all premature births, and for most maternal deaths. During the past decades, deaths of infants under a year old have decreased tremendously, but deaths of those under a month of age have increased. The majority of infants dying during the first month are born prematurely of mothers who have developed toxemia.

When eclampsia or convulsions occur, birth is usually induced to save the mother. If attempts to start labor are unsuccessful, a Caesarean section is often performed. Even if all goes well with both mother and infant, the cost of the delivery has probably doubled; the mother's convalescence is considerably lengthened; her chances of nursing her baby decrease; and any babies she may have in the future must also be delivered by Caesarean section.

At a recent public health meeting in our city, the head nurse of one of the large hospitals reported that there had been a tremendous increase in the incidence of toxemia and in the number of infants who were being born prematurely. She further stated that though "no one knew the cause," the hospital had opened new wards and trained special staffs for caring for such infants. I have even been on obstetrical wards where the number of unhealthy premature infants exceeded the full-term ones. Such is part of the price being paid for our soft-drink, refined-food culture.

The symptoms of toxemia. Most obstetricians consider toxemia to be any case in which the blood pressure is above 140/90 or in which a moderate to large amount of albumin is excreted in the urine. The onset of toxemia is characterized by a sudden increase in blood pressure. A woman's blood pressure can be 90/60 one week, but shoot up to 180/110 or more the following week. There is often a rapid gain in weight caused by edema, or pounds of water being held in tissues. The most common symptom noticed by the woman herself is swollen ankles, though she may also suffer from headaches and visual disturbances. If the condition becomes worse, she quickly develops convulsions.

Disadvantages of a premature birth. No woman in her right mind would fail to take steps to avoid a premature birth if she realized the problems such a birth can cause. For example, a far larger percentage of infants are born dead or die soon after birth than when the pregnancy is full term. Because hormones secreted late in pregnancy allow the vaginal membranes to become amazingly elastic, any delivery before these hormones are produced is usually a difficult one. Furthermore, such births can be horribly expensive. Young friends, both less than 19 years old, had a tiny 3-pound baby girl; it cost them more than $4,000, mostly for care and incubator fees, before this infant had grown enough to be taken home. The young husband, who had had to drop college, told me that he expected it to take him years to earn enough money to pay this bill. Yet it is small compared to the amounts families often pay later in seeking help for their children who were born prematurely.

Many fine, intelligent people have been born prematurely, of course, but they do appear to be exceptions. Psychiatrists say that most persons born prematurely carry emotional scars throughout life, many of which remain undiscovered for years. About 75 per cent have some congenital defects. For example, they have a high incidence of hearing defects and eye abnormalities and weaknesses not corrected by glasses; and they are particularly subject to blindness. They develop cerebral palsy far more frequently than other babies. Premature infants are often born with underdeveloped adrenal glands and an enlarged thymus. They usually develop rickets (p. 194), because there is too little time to deposit the normal amount of calcium in their bones; and they become anemic, because they lack vitamin E (p. 200) and are unable to store iron as does a full-term baby.

As they grow older, they suffer more assorted illnesses than do other children, are more often hospitalized, have more corrective surgery, more behavior disturbances, and usually do badly at school. Many have poor brain development, resulting in a wide variety of disabilities, especially when the mother had toxemia. Inability to read is a common problem. Dozens of studies show that children born prematurely are less intelligent than those born at term; and many are severely retarded. Furthermore, they develop more mental illnesses later in life.

Since parenthood at best is no bed of roses, certainly deficiencies which can cause premature births should be avoided.

Toxemia can be prevented. Though obstetricians by no means agree that the causes of toxemia are known, nutritional research indicates there are three major causes: a lack of folic acid before conception and during pregnancy (p. 35); a deficiency of vitamin E (p. 41); and the multiple deficiencies which result in edema. A condition similar to toxemia, long produced in experimental animals, results from combined deficiencies of magnesium, vitamin B_6, cholin, and protein, especially of the amino acid methionine.

No research appears to have been done on pregnant women whose diets have been adequate in protein and all the B vitamins. The importance of a liberal protein intake, however, was shown years ago. In one study of 1,400 cases, expectant mothers who ate 60 to 70 grams of protein daily suffered from toxemia almost twice as much as did another group having a daily intake of 110 to 120 grams of protein. Similarly, whenever the diet has supplied less than 54 grams of protein daily, toxemia has occurred. Moreover, if too little protein is eaten, blood proteins drop below normal; and women showing low blood protein have a high percentage of toxemia. Conversely, when the protein intake has been 80 to 120 grams daily, toxemia has decreased.

The B vitamins, however, are equally important. In one investigation of over 5,000 pregnant women, their diets were found to be grossly inadequate. When half of these women were given supplements which included the B vitamins, they suffered far less from toxemia and had fewer premature and stillborn infants than did women receiving no such supplements. Their protein intake, however, remained abnormally low. This seeming inconsistency is explained by the fact that a B vitamin, cholin (p. 54), is essential in preventing toxemia. It can be obtained from natural sources or certain supplements. If the protein intake is high, however, cholin can be made from the amino acid methionine.

In Europe during both world wars, the incidence of toxemia markedly decreased. Sugar became unavailable. In most countries the complete milling of grains was prohibited, and only whole-grain breads and cereals were allowed. Since little other food was to be had, the consumption of breadstuffs increased; thus expectant mothers were supplied with the B vitamins, vitamin E, and the valuable protein of the wheat germ.

Toxemia occurs only after giving ample warning. Let us see what the danger signals are and how to prevent them.

The high blood pressure of toxemia. When toxemia threatens, the blood pressure may skyrocket from low to high in a single week, bringing with it dizziness, headaches, ringing in the ears, and sometimes hemorrhages in the eyes. This blood pressure is far more serious than that which accompanies stress alone (p. 73).

When animals lack the B vitamin cholin, their kidneys become damaged, high blood pressure is produced, and albumin may be lost in the urine. If the diet is also limited in protein, anemia and edema occur simultaneously, thus completing the symptoms of toxemia. This kidney destruction produced by the cholin deficiency is said to be strikingly similar to that found at autopsy of women having died of eclampsia. Furthermore, autopsies of infants who died as a result of eclampsia in the mother show the same kidney and liver abnormalities found in the young of cholin-deficient animals.

Physicians are well aware that a cholin deficiency causes the liver to become abnormal; they frequently do not realize, however, that kidney damage, high blood pressure, and loss of albumin usually occur long before the liver is harmed. Each of these symptoms—high blood pressure, edema, albumin in the urine, and kidney damage, all characteristic of toxemia—was first produced by diets lacking cholin 30 years ago; and this research has been repeatedly confirmed. Nevertheless, I have not known of a single obstetrician who recommends this vitamin, nor have I found a supplement designed for pregnant women which contains it.

If the diet is extremely high in protein, however, an "excess" of the amino acid methionine can be changed into cholin. For example, when women suffering from nonconvulsive toxemia were given 260 grams of protein daily, including ¾ pound of liver, rich in both cholin and methionine, urine collection improved almost immediately. Their blood pressures and albumin in the urine decreased; they lost pounds of water weight; and no infant was stillborn or died soon after birth. Similarly, when patients with eclampsia were given 110 grams of protein daily with 5 grams of methionine, edema quickly disappeared, blood pressure fell to normal, urine excretion was accelerated, and often within a few hours pounds of weight (water) were lost.

When cholin alone has been given to persons with dangerously high blood pressure, in the majority of cases it has caused the blood pressure to drop to normal, edema to be corrected, and albumin to disappear from the urine. A woman who is deficient in one nutrient, however, is usually deficient in many. By damaging the kidneys, a lack of vitamins A and E can also elevate the blood pressure, which cannot be reduced by cholin but only by these vitamins.

It is known that the need for cholin is increased when refined sugar, alcohol, and/or solid, or saturated, fats are eaten. An expectant mother's daily requirements of either cholin or methionine, however, are not known, though 5 grams (5,000 milligrams) of each have been recommended. Such a quantity is almost impossible to obtain. The following table lists the richest sources of these nutrients in amounts one might take daily for a short time until danger is over.

Though these foods would supply the estimated need for methionine, cholin is still somewhat deficient. Because it is so difficult to obtain sufficient cholin (and other B vitamins) from natural sources alone, I recommend that pregnant women take 2 B-complex tablets after each meal, the total supplying 1,000 milligrams of cholin daily.

Other causes of high blood pressure. Often the high blood pressure resulting from a cholin deficiency is complicated by the elevated blood pressure induced by multiple stresses (p. 73) or by eating an excessive amount of salt. High blood pressure is also produced whenever the diet is deficient in potassium. A high intake of salt causes potassium to be lost in the urine. Persons salting their food to taste have been found to excrete nine times more potassium than when their salt intake was restricted. Furthermore, volunteers living on a potassium-deficient diet develop high blood pressure, which remains high until adequate potassium is again obtained. Unfortunately, the kidneys cannot conserve potassium as efficiently as they can sodium, especially after they have been injured by a lack of cholin or other dietary insults.

Though this type of high blood pressure can be decreased by limiting the salt intake—the usual procedure—unsalted foods are often unappetizing. The abnormal pressure can be decreased just as effectively and often more easily by merely increasing the potassium intake. All fruits and vegetables are rich in potassium. Torula yeast is particularly high in potassium and contains little sodium. Potassium can also be supplied by using potassium-chloride salt substitutes or with a doctor's prescription of

Foods to Eat Daily	*Methionine** mg.	*Cholin*† mg.	*Protein* grams
1 quart skim milk	930	160	34
½ cup powdered skim milk, non-instant	930	160	35
1 egg, cooked until firm	225	280	6
½ cup cottage cheese	900	150	20
¾ cup wheat germ	570	400	24
¼ pound beef	580	90	15–22
¼ pound liver	527	480–700	20
½ cup Torula yeast (80 grams)	1,011	360	40
2 servings cooked vegetables	0	10–300	0
1 tablespoon lecithin	0	250	0
Total, including liver instead of other meat	5,673	2,340–2,850	184–191

* Calculated from tables in *The Amino Acid Content of Proteins*, by R. J. Block and D. Bolling (Springfield, Ill.: Charles C. Thomas and Co., 1945), pp. 209–306

† Values for cholin taken or calculated from R. W. Engle, *J. Nutrition*, 25 (1943), 441

mg. = milligrams

potassium tablets. Foods especially rich in potassium, needed until your blood pressure is normal, are shown in the Tables of Food Composition (pp. 308-343).

Albumin in the urine. Because albumin in the blood occurs in rather large particles, the kidneys must first be damaged before albumin can be lost in the urine. This loss of albumin robs both mother and child of much needed protein. The damaged kidneys, however, allow most other nutrients to be excreted proportionately and simultaneously. As much as 30 grams or more of protein may thus be wasted day after day, an amount supplied by a quart of milk or 6 eggs. If the pregnant woman is also anemic, as she often is, still more albumin passes from the blood into the intestine and is lost in the feces. Since blood albumin plays the major role in urine collection, the more albumin wastefully excreted, the worse becomes the edema, and the more pounds of waste-contaminated fluids retained in the body. Yet loss of albumin in the urine has been repeatedly produced by diets deficient in cholin (p. 81).

Should albumin be found in your urine, your cholin intake should be increased immediately. If you and your unborn baby are not to be harmed, however, your diet must also supply enough protein to meet your own needs and your infant's requirements, and to equal all the albumin excreted in urine and feces; therefore, your protein requirement has probably soared to 150 grams or more daily, depending on the quantity of albumin lost. These proteins should be selected for their cholin and methionine content (p. 83). It becomes less difficult to eat such large amounts of food when you realize that your life and your infant's life are being threatened.

The convulsions of eclampsia. Though supplying adequate cholin and protein usually corrects such symptoms of toxemia as high blood pressure, edema, and abnormal losses of albumin, neither stops the convulsions which so often kill both mother and child. Fortunately, two other nutrients have been shown to stop convulsions: vitamin B_6 and magnesium.

Dr. John Ellis, of Mt. Pleasant, Texas, tells of a 17-year-old pregnant girl whom he first saw when she was brought into the hospital suffering from the convulsions of eclampsia. She had already experienced five major seizures in less than two hours, each so violent that it had taken several adults to restrain her. Dr. Ellis had immediately injected 200 milligrams of vitamin B_6, and within five minutes all evidence of convulsions disappeared. For two days he continued giving injections every six hours, together with 50 milligrams of the vitamin taken at each meal. Dr. Ellis found that the girl's blood pressure was 180/110, that she had been gaining water-weight at the rate of 10 pounds each week, and that she had experienced violent headaches which could not be relieved by medication. Her headaches disappeared immediately after the vitamin B_6 was injected and she lost weight at the rate of nearly a pound a day. Though most obstetricians would have induced labor immediately, causing her infant to be born prematurely, she was allowed to proceed with her pregnancy and gave birth to a healthy full-term infant six weeks later.

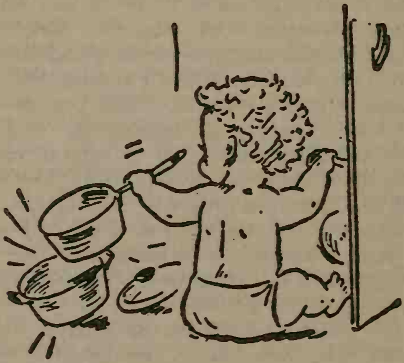
Measuring the amount of xanthurenic acid in the urine (p. 29) has shown that the more severe the deficiency of vitamin B_6, the more acute and dangerous are the convulsions accompanying toxemia. Even the placentas of women dying of eclampsia show severe vitamin-B_6 deficiencies. Roughly 95 per cent of all pregnant women do excrete xanthurenic acid, which is lost only when vitamin B_6 is inadequate. Women suffering from eclampsia, however, usually have at least 20 times more of this acid than do other pregnant women. The fact that their vitamin-B_6 deficiency is 20 times more severe may indicate that their requirement is unusually high. Experimental eclampsia with convulsions and edema has been produced in pregnant rats by a deficiency of vitamin B_6; and it can be prevented or corrected merely by giving the vitamin. The requirement of vitamin B_6 is known to increase at the third month and becomes progressively higher as the pregnancy advances. Furthermore, the larger the protein intake, the more vitamin B_6 needed and the worse the eclampsia becomes if this vitamin is not supplied.

Many investigators believe that the convulsions of eclampsia are identical to those of epilepsy, which have been stopped with vitamin B_6 or magnesium. Not all epileptic seizures, however, can be prevented by vitamin B_6; and tests for xanthurenic acid show that not all persons with epilepsy are deficient in this vitamin. Vitamin B_6, however, can be utilized effectively only when magnesium is adequate.

The blood magnesium is extremely low in women suffering from eclampsia. Furthermore, the convulsions of eclampsia were successfully treated by giving magnesium sulfate (Epsom salts) as early as 1906. These doctors gave a woman suffering from convulsions during labor injections of 11 grams, or 11,000 milligrams. Her convulsions stopped immediately; only 500 milligrams of magnesium have successfully alleviated the seizures of epilepsy. Recently huge amounts of Epsom salts (30 to 40 grams), given by injection to 7,000 women during the convulsions of eclampsia, brought prompt improvement with no observable ill effects to any infant. If magnesium is included in the daily diet throughout pregnancy, however, no such huge amounts are ever needed. Adults can rapidly excrete excess magnesium, but so little can be excreted by the immature kidneys of some infants that temporary paralysis can result, though this can be quickly overcome by giving calcium.

Taking diuretics causes deficiencies of magnesium, vitamin B_6, and cholin to be quickly produced. The obstetrician who carelessly gives diuretics, therefore, may indeed produce eclampsia in his patients and thereby run the risk of causing death of both mother and child.

Study after study has shown that when the diet is excellent, eclampsia and toxemia do not occur, babies are not born prematurely, and deliveries are relatively easy.



CHAPTER TEN

An Adequate Diet

An adequate diet can be defined as one which supplies each of the body requirements in amounts large enough to meet your individual needs. These requirements include protein, an essential fatty acid, and some 15 vitamins and 15 minerals. To plan an adequate diet, one must know the sources of each nutrient and the amounts needed.

At no time during life are your nutritional requirements so high as when you are pregnant or are nursing your baby. If you are to stay well and your baby is to be mentally and physically superior, these nutritional requirements must be met. Nature deals quickly and cruelly with carelessness or failure.

There are three general rules for planning any diet: all known nutrients must be supplied daily; foods should be unrefined, so that unknown nutrients may be included; and any nutrient which has been lacking should now be obtained in more than ample amounts. Even when your diet is completely adequate to meet the stress of pregnancy, nutrients may be destroyed in the body, may not be absorbed into the blood, or may be excreted in the urine or feces. Malnutrition is the result of deficiencies of essential nutrients in the cells rather than in the diet.

Because space does not permit details concerning each nutrient, I urge anyone unfamiliar with nutrition to read my book *Let's Eat Right to Keep Fit.* The information given in this chapter can be only an introduction or a brief review.

Count protein grams. Since the entire structure of your baby's body, including his brain, will be largely made from the proteins you eat, your first concern must be to obtain adequate protein of high quality. You will also require protein to keep your own muscles, vital organs, and other tissues in constant repair, to produce hormones, enzymes, antibodies, and blood cells for yourself, and to form new tissue in your uterus and breasts.

The proteins you eat are broken down during digestion into amino acids, which then become the building blocks for all body structures. Though there are a total of 22 amino acids, few protein foods supply all of them. By using sugar, fat, and nitrogen released from worn-out tissues the body can build 12 or more of these amino acids, which, therefore, do not have to be supplied daily in the diet. There are, however, 8 amino acids (10 when one is under stress) which the body cannot make; hence, if health is to be maintained, it is as essential for the diet to furnish these amino acids as it is to supply any vitamins.

A protein containing all the essential amino acids in generous amounts is said to be complete; proteins lacking one or more essential amino acids are incomplete. Body tissues cannot be built of incomplete proteins unless two or more of these proteins are combined in such a way that each furnishes the essential amino acids missing from the other.

Throughout pregnancy, you should eat 75 to 90 grams of protein daily if you are to produce a superior child. To obtain this amount is so important that you should memorize the grams of protein in the foods given in the following table. Know these figures so thoroughly that each night before you go to bed, you can calculate in a second your protein intake for the day. If the quantity is less than 75 grams, eat some protein-rich food before retiring. Because the proteins from animal sources contain larger amounts of the essential amino acids than do vegetable proteins, they should be given preference. Except for yeast, wheat germ, soybeans, and a few nuts, most vegetaable proteins lack many essential amino acids. A pregnant woman following a strict vegetarian diet may have a mentally defective child unless she is willing to eat cheese, eggs, and milk. Gelatin, the least complete of all proteins, contains an excess of the amino acid glycine, which causes such an imbalance that essential amino acids are lost in the urine. For this reason, gelatin should be avoided.

Unless you actually count protein grams daily, the chances are that you will obtain far too little of this valuable nutrient. As a result, your delivery will probably be unnecessarily difficult, and your baby will be inferior to what he could have been. I have found that thousands of people believe they are eating a high-protein diet when

Food	Amounts	Completeness	Protein grams
Whole milk	1 quart	com.	33
Skim milk or buttermilk	1 quart	com.	34
Yogurt	1 cup	com.	8–12
Powdered skim milk			
non-instant	½ cup	com.	35
instant	1⅓ cups	com.	35
Egg	1	com.	6
Yeast	¼ cup or 40 grams	com.	20
Peanut butter (natural)	2 tablespoons	inc.	9
Prepared cereals (cornflakes, bran flakes, etc.)	1 cup	inc.	2–3
Cooked cereal (oatmeal, ground wheat, etc.)	¾ cup	inc.	5–7
Wheat germ, raw or toasted	½ cup	com.	13
Cottage cheese	½ cup	com.	20
American or Swiss cheese	2 slices	com.	10–12
Meat, fish, or fowl	1 serving	com.	12–24
Macaroni, noodles, or rice	1 cup	inc.	3–4
Navy or lima beans	1 cup	inc.	6–8
Soybean flour	½ cup	com.	20
Soybeans, cooked	1 cup	com.	22
Whole-wheat bread	1 slice	inc.	3
White bread	1 slice	inc.	2
Bacon	1 slice, lean	inc.	2
Nuts	½ cup*	inc.	14–22

* The protein of a few nuts is complete.

they have an egg at breakfast and cheese or meat at the other meals.

A liberal protein intake can be expensive, but if non-instant powdered milk (35 per cent protein), brewers' yeast, and soy flour (both 50 per cent protein) are used liberally, it need not be. Well-seasoned cooked soybeans can be delicious and could be used far more than they are. A combination of one-third cornmeal and two-thirds cooked mature beans taken together at the same meal has been found to be almost as valuable nutritionally as egg-yolk protein. Cornbread with baked beans or kidney-bean salad might be eaten frequently.

If the budget is limited, a double-potency skim milk can be constructed by blending 1¼ cups of non-instant powdered milk with enough water to make a quart. This milk is not unpalatable and supplies twice the amount of protein and calcium as fresh milk. Unless this milk is drunk with a food containing fat, however, it should be mixed with equal parts of whole milk (p. 202). Non-instant powdered milk can be purchased from many dairies, small bakeries, and health-food stores; it can be used in cooking, together with soy flour, wheat germ, and yeast, to increase the nutritive value of dozens of foods.* Instant powdered milk makes most cooked foods gummy.

Unsaturated fatty acids. All fats are made up of fatty acids. These acids, from such solid (or saturated) fats as beef, pork, lamb, and coconut, can be used by the body only to produce energy. The liquid fats, such as fish oils and vegetable oils, are chemically unsaturated, or contain less hydrogen than do others. After a fat is digested and the fatty acids are absorbed into the blood, certain unsaturated acids can combine with protein to make up part of the structure of every cell in your body and of the body of your growing baby. The unsaturated fatty acids used for body structure are linoleic, linolenic, and arachidonic; all three are essential, but if linoleic acid is supplied in the diet, the other two can be made from it. These unsaturated fatty acids are also essential in keeping your blood cholesterol from becoming too high.

Most animal fats supply 2 to 5 per cent of unsaturated fatty acids, whereas vegetable oils contain 60 to 96 per cent of these valuable acids. Salad dressings, nuts, and peanut butter to which no hydrogen has been added aver-

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*Hundreds of recipes using these foods are to be found in the writer's *Let's Cook It Right* (New York: Harcourt, Brace & World, Inc., 1962).

age half vegetable oil; and avocado and wheat germ contain appreciable amounts. Throughout pregnancy, you should obtain at least 1 or 2 tablespoons of vegetable oil daily, either from foods or from oils used as salad dressing, as seasoning on vegetables, or for cooking. Some authorities believe it is best to vary the type of oil used and suggest combining two or three oils, such as soy, corn, peanut, and safflower oils. Oils should be refrigerated at all times and be discarded immediately should they become rancid.

Meeting your calcium requirements. Fresh and powdered milk are the only dependable food sources of calcium. Even cheese is not a reliable source, because the calcium is usually lost in the whey during cheese making. The calcium requirements are particularly increased during the last three months of pregnancy. Any carelessness in obtaining sufficient calcium can cause the expectant mother to suffer from nervousness, headaches, leg and foot cramps, insomnia, and susceptibility to tooth decay. An inadequate calcium intake can also cause her child to have faulty bone structure and teeth which are poorly formed, erupt late, are crowded and crooked in relation to the jaw, and will need straightening later. Such a child is far less beautiful than he should be.

Unfortunately, only a small amount of the calcium in the diet passes into the blood. Before absorption is possible, calcium must dissolve in the hydrochloric acid of the stomach. After this calcium has combined with fat to form a soap, which in turn dissolves much as does soap in a bathtub, it can be absorbed into the blood. When the diet has been inadequate before pregnancy, the stomach produces so little acid that almost no calcium can be absorbed. Similarly, if a woman is watching her weight and eats little or no fat, the lack of fat allows calcium to be lost in the feces. Even when one must reduce, it is better to drink whole milk than skim milk during pregnancy, preferably raw certified or other safe raw milk. The calcium in whole milk absorbs better than from any other source, because of the presence of both cream and milk sugar, or lactose. Milk sugar is changed by intestinal bacteria into lactic acid, which keeps calcium in solution and increases its absorption throughout the small intestine. Vitamin D also increases the absorption and utilization of calcium (p. 240).

A woman needs at least 2,000 milligrams of calcium daily throughout pregnancy and lactation, especially if her diet has been inadequate before conception. In case she absorbs more calcium than she needs at any particular moment, the excess is stored in the long bones for future use. Calcium not absorbed is merely excreted by the bowel. For these reasons an excess is never harmful. Abnormally deposited calcium, such as is found in arthritis, bursitis, and scleroderma, results from multiple deficiencies and not from an excess of dietary calcium.

Even after calcium reaches the blood, much of it may be lost in the urine. Normally, most of the calcium is used for building bones and teeth in combination with phosphorus. Our American diet, however, is low in calcium and excessively high in phosphorus. Unless calcium in the diet is adequate, this "excess" phosphorus is excreted in combination with much needed calcium withdrawn from the bones.

It is almost impossible for a pregnant woman to obtain adequate calcium without a supplementary source. Bone meal is most concentrated but is high in phosphorus. Egg shells are the cheapest. Calcium gluconate, or calcium combined with the sugar glucose, is sweet and dissolves easily but is bulky. It supplies only half as much calcium as does calcium lactate or calcium carbonate. If you do not object to the chalky taste, any of these calcium powders can be added to the day's supply of milk or taken in juice at any meal supplying fat.

Magnesium is a must. The diets of Americans of all ages are deficient in magnesium, which is especially needed during pregnancy. Magnesium is essential for the normal functioning of every cell in the body, including the brain. No protein can be synthesized without it, nor can vitamin B_6 be well absorbed or utilized. The taking of diuretics during pregnancy causes severe magnesium deficiencies to be produced. Even a milk deficiency causes a sensitiveness to noise, nervousness, irritability, mental depression, confusion, twitching, trembling, apprehension, insomnia, muscle weakness, and cramps in the toes, feet, legs, or fingers. Such symptoms are usually relieved in one or two days after magnesium is added to the diet.

The richest sources of magnesium are green leafy vegetables. Soils east of the Mississippi, however, are deficient in magnesium; and chemical fertilizers prevent this mineral from dissolving in soil solution, especially if lime is applied. The average American diet furnishes only 100 to 200 milligrams daily, whereas during pregnancy you should have a minimum of 800 milligrams. Your requirement, however, varies with your calcium and phosphorus intake; the more calcium and/or phosphorus you obtain daily, the more magnesium you need. For approximately every 1,500 milligrams of phosphorus in your diet, you should have 1,000 milligrams of calcium and 500 milligrams of magnesium. Write down all the foods you have eaten for at least one day and, by using the tables on pp. 308-343, calculate your intake of calcium and phosphorus; then supplement your diet accordingly.

Supplements with magnesium should be taken by every woman throughout pregnancy and lactation. Natural magnesium oxide extracted from ocean water is available in tablets supplying 250 milligrams each or in powder furnishing 600 milligrams in ½ teaspoon. This powder, when added to juice or milk, is tasteless provided it is not allowed to stand. Magnesium does cause the stools to become quite loose. If the budget is limited or if no other sources are available, Epsom salts, which is magnesium sulfate, can be used; ¼ teaspoon, supplying 300 milligrams might be taken at both breakfast and supper. In case you have a liquefier, calcium can be amply obtained by blending in milk or juice an egg shell, which supplies approximately 1,700 milligrams of calcium in the form of calcium carbonate; when well blended, it is not gritty and it has no flavor. Tablets containing the correct proportion of calcium to magnesium are available, made with magnesium oxide combined with calcium lactate, calcium carbonate, bone meal, or with mixed trace minerals.

Many foods which have much to offer nutritionally—wheat germ, yeast, meats, fish, eggs—supply excessive amounts of phosphorus with almost no calcium or magnesium. Unless calcium and magnesium are already added to yeast, desiccated liver, or granular lecithin, ¼ cup of calcium lactate and 1 tablespoon of magnesium oxide should be stirred or sifted into each pound to balance the phosphorus excess. Milk should be drunk with eggs, meat, fish, or other food high in phosphorus.

Do not overlook iodine. A lack of iodine during pregnancy increases stillbirth and malformed infants and, if severe, causes the baby to become an idiot known as a cretin. Even a slight deficiency results in mental retardation. I once interviewed a mother of above-average intelligence who had lived in the Northwest goiter belt during two pregnancies. Her 13-year-old had the mental age of six years; a repulsively homely child of five was so subnormal that she could communicate only by shrill squeals. These tragedies could have been prevented at no cost had the mother used iodized salt. Because little iodized salt is now being used, however, goiter is rapidly increasing; and the need for iodine is so great during pregnancy that the thyroid gland often becomes enlarged, as in simple goiter. When pregnant women have been given 30 milligrams of iodine daily, no such swelling occurred; their energy output increased, and their health improved far more than controls receiving no iodine.

No one knows the amount of iodine required during pregnancy, but scientists agree that too little is obtained. Seafoods and kelp are the only dependable food sources. In Japan, where abnormalities of the thyroid are nonexistent because seaweed is used as a food, the average daily intake of iodine is 3 milligrams or more. Massachusetts children were found to be markedly deficient and their daily requirement was approximately 1 or 2 milligrams. A pregnant woman, therefore, should probably get 3 to 4 milligrams of iodine daily. It is impossible to obtain this quantity from salt, though iodized salt should be used exclusively. Some dependable source must be found, particularly for women living in the goiter belts around the Great Lakes and the Pacific Northwest where iodine deficiencies are often severe.

Excessive iodine can be toxic. Physicians have given as much as 2.5 grams—2,500 milligrams—daily to children, however, for as long as five years without detecting toxicity. Nevertheless, the Food and Drug Administration has limited the sale for iodine in supplements to 0.15 milligram, a ruling which is causing untold suffering. Even kelp tablets are of no value unless at least 20 are taken daily. Granular kelp is not particularly palatable, but can be used as a seasoning or taken in tomato juice; a teaspoon daily would supply the amount of iodine needed. If you ask him, your physician may give you a prescription for Lugol's solution, or iodine tablets. Each week I take one tablet furnishing 100 milligrams of potassium iodide, obtained on a prescription written by a dentist. A single drop of tincture of iodine is said to supply 40 milligrams; when I have been unable to find other dependable sources of iodine, I have taken a single drop in water once or twice a week.

Iron and copper are essential. Both iron and copper are needed to prevent anemia in the baby and mother alike; and considerable amounts of both are stored in the infant's body during the last two months of pregnancy. The requirements are particularly high in the case of twins.

Copper and iron are abundant in yeast, liver, egg yolk, green leafy vegetables, and whole-grain breads and cereals. If these foods are eaten and all refined foods avoided, adequate iron is easily obtained and a supplement is rarely needed. The absorption of iron is almost doubled when taken with 500 milligrams or more of vitamin C daily.

Most iron salts quickly destroy vitamin E; therefore, when taken during pregnancy, they may cause a miscarriage, a premature birth, difficult, prolonged labor, or oxygen deficiency in the infant. Iron in foods is never toxic.

By using the Tables of Food Composition (pp. 308-343), calculate your iron intake. It should be 18 milligrams daily. If iron is adequate, copper found with it in foods is also thought to be.

Other minerals. Potassium, zinc, manganese, cobalt and several trace minerals are necessary for health, and some are known to be needed in larger amounts during pregnancy. For example, most fruits and vegetables are rich in potassium, which is usually adequate if these foods are eaten. The stress of pregnancy, however, causes much potassium to be lost in the urine, especially if the salt intake is high; a lack results in indigestion, constipation, and muscle weakness. Zinc is particularly important during pregnancy because it is essential before DNA can be formed; and deficiencies are widespread in the United States. Because manganese appears to prevent certain congenital defects, it, too, is extremely important during pregnancy.

Vegetables grown on mineral-rich soils free from chemical fertilizers are rich sources of these minerals. Seafoods and kelp supply zinc; wheat germ is a rich source of manganese; and Torula yeast is high in most trace minerals and in potassium. It is usually wise to obtain a supplement of mixed minerals throughout pregnancy and lactation. If such a supplement contains iron, however, it should be taken eight to 12 hours after vitamin E.

Obtain adequate vitamin A. Though vitamin A is widespread in foods, the expectant mother may not obtain adequate amounts. Usually she controls her weight and forgoes such sources as generous amounts of cream and butter. Only a small amount of carotene, which the body changes into vitamin A, can be absorbed from fruits and vegetables; it is held within cell walls made of undigestible cellulose. For instance, only 1 per cent is absorbed from carrots eaten raw and 30 per cent from cooked ones. The nitrates in chemical fertilizers destroy carotene and vitamin A both in our foods and in our bodies. In addition to the nitrates, drugs, pesticides, and food additives appear to decrease the utilization of and/or increase the need for this nutrient; and recent autopsy studies show that even persons dying of accidental deaths have almost no stored vitamin A, though their intake was thought to be ample.

The only sources of vitamin A adequate in amount, readily absorbed, and practically free from calories are concentrates of fish-liver oil. I usually recommend that an expectant mother in good health take daily throughout her pregnancy a capsule supplying 25,000 units of natural vitamin A and 2,500 units of natural vitamin D. If she has low resistance to infections or has been deficient in this nutrient, 25,000 units of vitamin A daily for several months are desirable. Since malformations have been produced experimentally when this vitamin is deficient, the supplement should be started well before conception.

Though vitamin A appears to be destroyed during all infections, the destruction is particularly rapid during measles. If a mother suffers from measles (rubella) during the first three months of pregnancy, her baby may be born blind and have other defects identical to those produced in the young of animals when the mother is deficient in vitamin A early in pregnancy. Contracting measles later than the third month can also cause the baby to have damaged vision and hearing and speech defects not obvious at birth. For this reason, I would recommend to physicians that any mother exposed to measles during her pregnancy temporarily increase her vitamin-A intake to 50,000 units and vitamin E to 600 units daily. It would also be wise for her to follow the antistress program (p. 110) for a week or more, particularly if she actually develops measles.

Carotene and natural vitamin A, like vitamins D, E, and K, dissolve in fat. These fat-soluble vitamins can be absorbed into the blood only in the presence of fat and bile salts; therefore, concentrates of these vitamins should be taken after a meal containing some fat, which stimulates bile flow. Since fat-soluble vitamins cannot pass readily through the placenta, babies are born vitamin-A poor, causing them to be particularly susceptible to infections. Because water-dispersed vitamin A passes more easily into the infant's blood, it may be preferable to take during the last month of pregnancy.

The B vitamins are difficult to obtain. It is almost impossible for a pregnant woman to obtain adequate amounts of B vitamins. Furthermore, the richest sources of these nutrients—brewers' yeast, liver, and wheat germ—she may find unpalatable. Yet, as we have seen, most of the illnesses common to pregnancy are caused by a lack of these vitamins.

This group consists of vitamins B_1, B_2, B_6, and B_{12}, niacin amide (vitamin B_3), pantothenic acid, folic acid, para amino benzoic acid (PABA), biotin, cholin, inositol, and three antistress vitamins. Except when one is under stress, the antistress vitamins appear to be produced in adequate amounts by intestinal bacteria. These B vitamins are not stored in the body; hence foods supplying them should be eaten daily throughout pregnancy.

Yeast is the most concentrated source of these vitamins and lowest in calories. If yeast is new to you, start by stirring no more than one teaspoon in a glass of milk or juice and increasing the amount gradually. The lumps disintegrate on standing. Sip the yeast through a straw to prevent gas distention. Most women who take a tablespoon of yeast in milk at each meal throughout pregnancy find that they feel rested, energetic, and so free from problems that they would not do without it. Under no circumstances, however, should you eat live yeast used for making bread. Pasteurized or food yeasts are all approximately 50 per cent protein, but they vary widely in B-vitamin content. Study labels carefully and buy a yeast which supplies all of these vitamins in roughly the same proportion found in healthy human tissue (p. 191). Some yeast can be purchased which already has the phosphorus content balanced with calcium and magnesium; if it is not, add these minerals to yeast and also to lecithin and desiccated liver (p. 93) if you use them. Under no circumstances should you take yeast in which the phosphorus is not balanced with calcium and magnesium. Yeast is extremely rich in iron and trace minerals.

Try to eat liver several times a week or, if you are anemic or are under great stress, have it daily for a while. Contrary to widespread publicity, liver is not a storage organ for DDT, pesticides, and other poisons. It is a detoxifying organ, however, and it produces substances which combine with toxic materials, causing them to be excreted in the feces. Few foods are nutritionally superior to liver. Desiccated, or powdered, liver is also excellent but unpalatable. A tablespoon or two stirred into water or juice at any meal when fresh liver is not eaten usually improves general health and banishes fatigue so quickly that taste may seem unimportant. If you prefer liver tablets, 15 equal a tablespoon of dried liver or 2 ounces of fresh. It has been my experience that the more yeast and liver a woman takes during pregnancy, the better she feels, the easier is her delivery, and the healthier and more beautiful is her baby.

Wheat germ is also an excellent source of most B vitamins. Use it as a cereal, or add it to any unrefined cooked cereal or to the highly nutritious cold cereals available at health-food stores. Wheat germ and middlings alone make a delicious cooked cereal, especially when simmered in milk. Wheat germ can be used liberally in baking. The palatable toasted wheat germ widely available has lost some nutritive value by being heated, but more is usually eaten than if it were untoasted.

Whole-grain breads and cereals are fair sources of the B vitamins; use them exclusively and avoid all white-flour products. Certain foods supply individual B vitamins: milk is rich in vitamin B_2, brains in cholin, and meats in niacin amide. Only by eating liver, yeast, wheat germ, and possibly yogurt, however, can the need for the entire group of 12 or more of these vitamins be met.

When yogurt and acidophilus milk or culture are taken frequently, their valuable bacteria live in the intestine and produce B vitamins. The importance of these foods is shown by the fact that oral antibiotics, by destroying these bacteria, allow multiple B-vitamin deficiencies to occur (p. 261). Sweetened commercial yogurt contains far too much sugar to be recommended. The best and cheapest yogurt can be prepared by combining 6 cups of warm water, 1¾ cups of non-instant powdered milk, and 1 large can of evaporated milk with yogurt bacteria. The starter can be a pure culture or ¼ cup of plain commercial yogurt or the last yogurt made, which can be kept fresh indefinitely by being frozen. This mixture, poured into jars, can be incubated in an electric yogurt maker until it is the texture of baked custard, or for about 4 hours. Yogurt can also be incubated in a foam ice bucket provided you have a thermometer. In this case liquefy the powdered milk into 3 cups of warm water, add the evaporated milk, and use 3 cups of boiling water to bring the temperature to 120 to 125° F. before stirring in the starter. A temperature higher than 125° F. can kill the bacteria, but a lower one will prevent their growth. Because cows are so often given antibiotics which are excreted in milk and will destroy yogurt bacteria, making yogurt of fresh milk is usually unsatisfactory.

Since the B vitamins dissolve in water, they are readily lost in urine. The stimulating effect of coffee and caffeine-containing soft drinks causes them to be washed through the body. Such a loss is especially rapid when diuretics are taken. Folic acid, which is so vital both before conception and during pregnancy (p. 30), is quickly harmed by heat.

Meeting your vitamin-C needs. Your minimum vitamin-C requirement can be met by eating 1 or 2 fresh oranges daily together with whatever other fresh vegetables, fruits, and juices you obtain. The need for this vitamin is tremendously increased by stress and by any foreign substances reaching the blood, such as drugs, viruses, allergens, food additives and preservatives, and impurities from water and air. For this reason, it is undoubtedly wise to take a 500-milligram tablet of vitamin C (ascorbic acid) with one or more meals daily throughout pregnancy.

Vitamin C is more completely utilized when taken with bioflavonoids, concentrated in the pulp and white of the rind of citrus fruits. Try to have at least one orange daily, peeled in such a way that the white part of the skin may be eaten. The cheap, synthetic vitamin C, however, is identical to the natural. Powdered vitamin C or tablets of 500 milligrams are the most economical.

Obtain ample vitamin D. Because vitamin D is necessary before calcium, magnesium, and phosphorus are efficiently absorbed and utilized, it is especially important during pregnancy. This vitamin is not found in foods in significant amounts. The only dependable sources are fish-liver oils and vitamin-D preparations. Dr. Toverud, who spent decades in vitamin-D research, stressed that if vitamin D was undersupplied in the mother's diet, babies were born with such poor skeletal development that they were particularly subject to birth injury; and that such infants later developed ugly bone structure and crooked teeth, susceptible to decay.

Abnormal calcium deposits can be laid down in the soft tissues especially of babies if more than 3,000 units of vitamin D as irradiated ergosterol are taken daily. Natural vitamin D from fish-liver oil, however, is rarely if ever toxic. Studies have shown that calcium is retained efficiently only when 2,000 units of natural vitamin D have been obtained daily. Furthermore, the women who produced the superior babies in the Toronto study (ch. 2.) received 2,000 units per day of this natural vitamin. Because even small amounts of the synthetic vitamin D, or irradiated ergosterol, may be toxic, physicians have been wise in restricting the quantity recommended to 400 units daily.

Vitamin D added to calcium tablets or preparations of mixed minerals is not stable and should not be relied upon.

Vitamin E is essential. No food is a reliable source of vitamin E, which is lost when oils are refined and flour is milled. The quantity needed is unknown but varies with individuals and the amount of oil in the diet. Research indicates that an adult woman's requirement is between 140 and 210 units daily when not pregnant, yet the need for this vitamin is known to skyrocket during pregnancy. Probably 300 to 600 units of vitamin E daily are desirable, though this vitamin is expensive. Wheat-germ oil, the richest source, supplies only a unit per capsule.

The scientific name for vitamin E is d-alpha tocopherol acetate. The natural vitamin, which is obtained by distilling vegetable oils such as corn, wheat germ, or soybean oil, has produced better results than the synthetic. Mixed tocopherols are not stable and should therefore be avoided.

Like vitamins A and D, vitamin E can be efficiently absorbed only when taken after a meal containing some fat.

Vitamin K can prevent tragedy. Vitamin K is necessary before blood can clot normally. It is generously supplied in foods and is produced by bacteria in the intestinal tract, but because it dissolves in fat, it does not pass readily into the blood of the unborn infant. For this reason newborn babies are particularly susceptible to hemorrhage; should one occur in the brain or spinal cord, it can cause cerebral palsy. Some obstetricians used to give injections of vitamin K to the mother during labor or to the infant immediately after birth. Unfortunately, because too large quantities of synthetic vitamin K proved to be toxic, this excellent precaution has been largely discontinued; and the vitamin is no longer sold without a prescription.

To give your baby as much vitamin K as possible, eat daily during the last month of pregnancy the foods which are the richest sources: fresh liver, a cooked green leafy vegetable, and freshly made yogurt.

Your reward. Any woman who obtains ample amounts of each nutrient discussed in this chapter for several months before conception and throughout her pregnancy can greatly enhance her chances of having a truly superior baby.

CHAPTER ELEVEN

Your Daily Program

Our next problem is to determine how your diet can supply all the nutrients needed daily to maintain your own health and allow your baby to build a superior body and brain. Research has shown that it is not enough to obtain adequate amounts of each essential nutrient. Insofar as it is possible, all of these nutrients should be furnished to the cells at the same time. The following drink was designed to meet this need.

Fortified milk, or pep-up. When well prepared, this drink is not unpalatable, though no woman should first try it if still nauseated. I know a number of mothers who have drunk a quart of pep-up daily throughout pregnancy and lactation, and their babies have been beautiful indeed. If you analyze this drink by using the Tables of Food Composition (pp. 308-343), you will understand why.

Prepare pep-up by blending, preferably in a liquefier:

2 cups fresh whole milk
½ cup non-instant powdered skim milk
1 tablespoon food yeast; gradually increased to ¼ or ½ cup
1 teaspoon real vanilla
1 tablespoon of vegetable oil, or a combination of soy, corn, safflower, and/or peanut oils
½ cup of your favorite fruit, such as banana, crushed or chunk pineapple, berries, or undiluted, frozen orange juice
1 or 2 raw eggs (unless you prefer them cooked)
½ egg shell, or ½ teaspoon bone meal, or 2 tablespoons calcium gluconate, or 1 tablespoon calcium lactate or carbonate (unless you prefer tablets)
1 tablespoon lecithin (p. 83) if desired

¼ teaspoon magnesium oxide; add to a serving immediately before drinking it, or take in a tablet

When these ingredients have been well blended, add the remainder of a quart of milk. Until pep-up is familiar to you, use only a little yeast, calcium, and lecithin, and sip slowly no more than ¼ cup at each meal and mid-meal. Gradually increase quantities later. I personally prefer to take lecithin stirred into juice and to get my calcium and magnesium from tablets.

Are supplements necessary? Ideally, all nutrients should be obtained from natural foods. If you have your own cow or goats, can get fertile eggs, make your own breads of freshly ground whole grains, are growing your fruits and vegetables on naturally enriched soils free from chemical fertilizers and poison sprays, are spending much of your time in the sun, and are avoiding all refined foods, you will progress nicely without supplements.

For example, half of a group of 1,200 pregnant women living in the Kentucky mountains were given vitamin supplements, and the intelligence of their children, measured at three and four years of age, was compared to that of the children of a similar group of mothers who received inert placebos. These farm women grew, canned, and dried their own fruits and vegetables, and raised chickens, pigs, and cows or goats. They ate little or no refined foods. The children of both groups of these well-fed mothers were equally intelligent. In contrast, when hundreds of mothers living in Norfolk, Virginia, largely on refined foods, were given vitamin supplements during pregnancy, their children were more intelligent than the youngsters of similar urban mothers receiving no such supplements. The mothers allowed the supplements also remained healthier during their pregnancies.

Almost 90 percent of our foods are refined or processed in such a way that tremendous losses in nutritive value occur. Furthermore, if your diet in the past has been deficient and/or you are already suffering from fatigue, anemia, or other deviations from health, your diet should immediately be made more than adequate. Supplements make it possible to overcome deficiencies rapidly.

The problems discussed in the preceding chapters indicate which supplements you as an individual may need to emphasize. It is important to remember that when the diet of expectant mothers has been supplemented until it is somewhat adequate in essential nutrients, their babies have been healthier, far fewer have been born prematurely, and they have later been found to have higher IQ's than children of comparable women who had taken no supplements. Certainly most pregnant women should supplement their diets with cholin and vitamins B_6 and E.

Can prescription supplements be relied upon? It is difficult to believe that your own fine obstetrician, obviously interested in safeguarding your health and that of your unborn baby, should prescribe supplements which are not adequate. Such, unfortunately, is the case in many instances. Representatives from the drug firms, selected for their ability to inspire confidence, have repeatedly assured your physician that certain supplements furnish all the nutrients any pregnant woman needs; yet many salesmen are completely untrained in nutrition. For example, though folic-acid deficiency has been found to be the most common one during pregnancy, of 48 multiple-vitamin preparations designed especially for expectant mothers not one contains folic acid. Even prenatal supplements sold on prescription, which could easily furnish larger amounts, contained only 0.1 milligram if any at all. Research indicates that 1 to 5 milligrams are needed to stimulate normal cell formation and to prevent disfiguring "pregnancy cap" and anemia in the mother and such abnormalities as harelip and cleft palate in the infant Unless you are willing to eat liver and yeast daily to obtain folic acid, ask your physician or dentist for a prescription.

I have carefully examined the labels of the many prenatal supplements carried by our local drugstores. Though all were expensive, most furnished only 4,000 units of vitamin A, 400 units of vitamin D, and no vitamin E whatsoever. Despite the fact that the stress of pregnancy tremendously increases the need for vitamin C and pantothenic acid, only one brand furnished more than 50 milligrams of vitamin C; pantothenic acid was usually lacking, though a few brands supplied a useless 3.3 milligrams. Even the amounts of the cheaper B vitamins were small. Some brands contained no vitamin B_6, whereas others supplied only 3 to 10 milligrams. Not one supplement offered the B vitamins inositol, biotin, PABA, or even cholin, so tremendously important in preventing toxemia (p. 80).

Of the minerals in prenatal supplements, only calcium was furnished in an amount large enough to be of value. Usually it ranged from 150 to 600 milligrams. The amounts of other minerals were nothing less than ridiculous. All except one supplement lacked magnesium; it contained 0.2 milligram, which compares poorly with the 800 milligrams required daily throughout pregnancy. A few supplied 20 micrograms of iodine, though apparently the daily need is approximately 3 milligrams, or 3,000 micrograms (p. 94). One label claimed a potency of 1.67 milligrams of potassium; at least 3,000 to 5,000 milligrams are needed daily (p. 95). Such valuable minerals as manganese, cobalt, copper, zinc, and many others were completely lacking.

Most tragic of all is that several prenatal supplements contained 150 milligrams of iron salts so toxic that the label carried the warning: "Keep out of reach of children." Annually these iron compounds cause the accidental death of many children believing them to be candy. Yet it has been known for over 40 years that such iron compounds destroy vitamin E, already meagerly supplied in the mother's diet. The destruction of vitamin E usually causes women taking iron salts to have prolonged, difficult labors, to say nothing of inducing premature births, and jaundiced and anemic infants (p. 201).

Pregnant women are usually asked to purchase on a prescription these supplements especially designed for them by drug houses largely motivated by sales. Such supplements offer little of value, are far too expensive, and, because of the high iron content and lack of vitamins B_6, E, and cholin, are dangerous for both mothers and infants. No obstetrician trained in nutrition would give them. No mother interested in her baby would take them.

Good food is, of course, far more important than supplements. Buying supplements needed during pregnancy, however, is an economy, not an extravagance. Talk with any mother you meet who has an unhealthy baby, and she will tell you of tremendous medical expenses. Usually there are antibiotics and even hospitalization for numerous infections. Often there must be surgery for congenital defects and malformations. Eye examinations and glasses add to the expense. Not infrequently parents search endlessly for help for the mentally retarded child. Allergy tests and shots are almost invariably part of the picture. Such endless expenses which continue for years might have been largely or completely avoided had false economy not been practiced.

Our foods have become so refined that, if health is to be maintained, one usually cannot afford not to buy supplements.

How to determine supplements needed. The more carefully you select your food, the fewer supplements you will need. Supplements, however, should furnish any essential nutrients not obtained in adequate amounts from foods. The best way to determine the nutrients needed is to record your food intake for one or more days, analyze its nutritive value by using the Tables of Food Composition (pp. 308-343), and compare your totals with the recommended dietary allowances given in the following chart. For example, if you find you can obtain from food only 600 milligrams of calcium daily, then a supplement should furnish 1,400 milligrams or more. Unfortunately, figures are not available for the quantities in foods of such nutrients as zinc, iodine, vitamin B_6, pantothenic acid, and others. Only supplements can be relied upon to furnish the quantities needed.

The following chart lists the daily allowances of essential nutrients recommended by the National Academy of Sciences—National Research Council. The two columns at the right give quantities which have produced healthier mothers and/or superior infants. Notice that the National Academy of Sciences recommends eight times more folic acid than our Food and Drug Administration allows to be sold without a prescription; but that the quantity of vitamin B_6 they consider adequate would not prevent the many illnesses of pregnancy.

The two nutrients impossible to get from foods are vitamins D and E; spend money on these first. And move heaven and earth to get 1- to 5-milligram tablets of folic acid; those obtained from a veterinarian are equally good, yet far less expensive than those packaged for humans.

To be doubly sure that all nutrients are amply furnished, I recommend a variety of supplements for both prospective parents before conception and for the wife during pregnancy and lactation. For example, a fish-liver-oil capsule taken daily, supplying 25,000 units of natural vitamin A and 2,500 units of natural vitamin D, furnishes adequate amounts of these vitamins.

Because yeast, liver, and wheat germ are not always eaten daily, I recommend that 2 B-complex tablets be taken after each meal in addition to a daily intake of 10 to 30 milligrams of vitamin B_6 and 1 to 5 milligrams of folic acid. The ones I use supply a daily total of 5 milligrams each of vitamins B_1, B_2, and B_6; 50 milligrams of niacin amide and pantothenic acid; 1,000 milligrams of cholin and inositol; 0.1 milligram of folic acid; 30 milligrams of PABA; and 15 and 25 micrograms of vitamin B_{12} and biotin respectively. Except for folic acid, these are the proportions found in normal human tissues and in

Recommended Daily Dietary Allowances

	NAS–NRC		Healthier mothers–superior infants	
	Before conception and during pregnancy	*During lactation*	*Before conception and during pregnancy*	*During lactation*
calories	2,200	3,000	2.200	3,000
protein, gr.	65	75	75–90	90–110
calcium, mg.	1,200	1,300	2,000	3,000
magnesium, mg.	450	450	800	800–1,200
iron, mg.	18	18	12	12
zinc, mg.	—*	—*	10–15	15–20
iodine, mg.	0.125	0.150	3–4	4–5
vitamin A, U.	6,000	8,000	25,000	25,000
vitamin B_1, mg.	1.1	1.5	4–5	5–6
vitamin B_2, mg.	1.8	2	5–10	5–10
niacin amide, mg.	15	20	50	60
vitamin B_6, mg.	2.5	2.5	10–20	15–25
vitamin B_{12}, mcg.	8	6	15	15
pantothenic acid, mg.	—*	—*	50–100	100–150
folic acid, mg.	.8	.5	1–5	1
cholin, mg.	—*	—*	1,000	1,000
inositol, mg.	—*	—*	1,000	1,000
vitamin C, mg.	60	60	500–1,000	500–1.500
vitamin D, U.	400	400	2,000–2,500	2,000–2,500
vitamin E, d-alpha tocopherol, U.	30	30	200–600	200–600

* No recommendation made

gr. = gram; mg. = milligram; mcg. = microgram; U. = unit.

healthy animals. It is important that such proportions be generally adhered to, though the requirement of vitamin B_6 does increase during pregnancy and of pantothenic acid during stress. When an excess of any one B vitamin is taken for a prolonged period, however, it increases the need for other B vitamins and can produce deficiences of them. If you read labels, you will find that many B-complex preparations supply 100 milligrams of B_1, perhaps 2 milligrams of B_6, and no cholin or inositol. Such preparations are dangerous.

Because pregnancy is a stress which increases the need for vitamin C, a higher degree of health can be maintained when inexpensive tablets of ascorbic acid are taken. Watch for sales. Money need not be spent on the natural vitamin C—identical to the synthetic—as long as an orange is eaten daily, preferably with the white of the rind.

In purchasing a vitamin-E supplement, read the label carefully and get only the d-alpha tocopherol acetate. Avoid mixed tocopherols, which are unstable.

Mineral supplements should furnish approximately twice as much calcium as magnesium; usually 1 or 2 tablets of calcium and magnesium combined are needed after each meal. If they contain trace minerals and iron, however, they must be taken eight to 12 hours later than vitamin E. All the supplements mentioned here are sold at most health-food stores and some drugstores.

Keep your supplements in a divided plastic container such as those sold for carrying fish flies. If left in bottles, they are too often forgotten and/or identified with medication.

Your daily schedule. The following menus show how your required nutrients can be obtained:

BREAKFAST

1 sliced orange with white of rind, ½ grapefruit, or other fresh fruit
1 or 2 tablespoons of yeast in milk, juice, or pep-up
If desired: 1 or 2 eggs; sautéed liver; ¼ to ½ cup wheat germ; unsweetened yogurt with frozen, undiluted orange juice; lean meat, fowl, or fish; or whole-grain cereal cooked in milk or with powdered milk added
1 slice whole-wheat toast if weight permits
decaffeinized coffee if desired
1 capsule supplying vitamins A and D

B-complex tablets high in cholin and inositol
vitamin B_6, 10 to 25 milligrams
vitamin-C tablet, 250 milligrams or more
vitamin-E capsule, 200 units or more
2 or 3 tablets supplying both calcium and magnesium
kelp or other source of iodine

MIDMORNING AND MIDAFTERNOON

¼ to ¾ cup of pep-up; or yogurt, buttermilk, whole milk, and/or fresh fruit

LUNCH

1 or 2 tablespoons yeast in milk, juice, or pep-up if not taken at midmorning
½ to 1 cup yogurt, eaten with fresh fruit or frozen, undiluted juice
seafood, cottage cheese, fowl, lean meat, eggs, or natural peanut butter
salad or cooked vegetables seasoned with oil or mayonnaise
1 glass, or 8 ounces, whole or skim milk if no yogurt is eaten
supplements if need is indicated

SUPPER

Meat, fish, fowl, or meat substitute; or meat or milk soup
1 or more cooked vegetables, including a green leafy one such as beet tops, spinach, chard, or kale, preferably seasoned with oil
salad with oil dressing if desired
whole or skim milk, yogurt, buttermilk, or pep-up
fresh fruit if desired
tablets supplying manganese, zinc, copper, cobalt, and other trace minerals; if iron is included, the entire day's supply of vitamin E must be taken after breakfast only
same supplements as after breakfast except for vitamins A and D

AT BEDTIME

Pep-up, yogurt, or whole milk, taken with fresh fruit
mixed mineral tablets or other supplements if need is indicated

The foregoing menus are merely suggestions, or a general goal to strive toward. A variety of foods is listed to give you freedom of choice. Select the ones you enjoy and which are most essential first, and let the remainder go.

Avoid the junk foods. If you genuinely want to produce a superior child, avoid all refined foods, which can offer nothing toward building health. These include jams, jellies, candies, rich desserts, and all package mixes and sweet bakery products; sweet gelatin desserts; prepared puddings; imitation fruit drinks and synthetic fruit ades; soft drinks; alcoholic beverages; imitation cream, both powdered and liquid; prepared cereals, unless purchased from a health-food store; refined cooked cereals; "wheat" breads (refined) to which brown dye has been added; all hydrogenated fats and foods cooked in hydrogenated fats, such as potato chips, cocktail snacks, and French-fried seafoods; hydrogenated peanut butter; processed cheeses; and all products made with white flour, including unbleached flour and so-called "enriched" flour. Cold meats, wieners, and corn beef should also be avoided because of the large amounts of nitrates added to preserve them and produce the pink color.

When under stress. Anything which damages the body, be it infections, allergies, drugs, overwork, lack of sleep, anxiety, diarrhea, surgery, x-rays, or similar factors, causes every nutrient to be needed in larger than usual amounts. To repair the harm done, the pituitary and adrenal glands must react by sending into the blood hormones such as ACTH and cortisone, which mobilize lifesaving defenses (p. 72). How efficiently one copes with stress depends on his ability to produce these hormones. The pituitary, or master gland, can function only when the diet is adequate in protein, vitamin E, and the B vitamins cholin, pantothenic acid, and vitamin B_2. The adrenal glands cannot produce cortisone and other hormones unless amply supplied with linoleic acid, vitamins A, B_2, and E, and especially pantothenic acid. Even a mild deficiency of pantothenic acid causes these glands to hemorrhage, shrivel, and become so filled with dead cells that no hormones can be produced. If pantothenic acid is quickly added to the diet, the cortisone output increases in a single day. The effect is much the same as giving cortisone medication, but with no toxicity. If a pantothenic-acid deficiency is allowed to continue, however, recovery is slow.

The need for vitamin C is tremendously increased by stress. Animals often require 70 to 75 times more of this nutrient during stress than is usually sufficient; translated into human needs, such a quantity would be 5,000 to

6,000 milligrams per day. Vitamin C increases the rate of cortisone production, improves its utilization, delays its breakdown, and decreases the need for pantothenic acid. Large amounts of both vitamin C and pantothenic acid give remarkable protection to humans who are under stress; and pantothenic acid, like vitamin C, is not toxic even when taken in such huge quantities as 10,000 milligrams daily.

An antistress program. If during your pregnancy you become ill or must endure multiple stresses, an antistress program should be followed temporarily. Your baby cannot be protected nor can your health be regained until the nutritional demands of stress are met. The amount of nutrients required depends on the severity of the stresses.

The following program usually produces excellent results during such emergencies: sip slowly every three hours round the clock, including at night if you awaken, ½ to ¾ cup of pep-up, made with 1 or 2 eggs per quart; take each time 500 to 1,000 milligrams of vitamin C and 100 milligrams of pantothenic acid. For less severe stress, half the foregoing quantities of vitamins taken six times daily may be sufficient. Continue all other supplements specified for daily use (p. 107).

In addition to the pep-up and vitamins, have daily: ¼ pound of fresh liver and/or a tablespoon of desiccated liver or 15 tablets; one serving of a cooked green leafy vegetable, such as beet tops, spinach, or chard; and ¼ cup or more of wheat germ.

Usually improvement is marked after three or four days, and one can then return to a less strenuous schedule.

When adrenals are already exhausted. Multiple stresses and an inadequate diet before and during pregnancy can cause the adrenal glands to become so exhausted that the baby will be born with adrenal insufficiency. The mother's adrenal exhaustion is shown by low blood pressure, low blood sugar, and usually a history of allergies. The baby of this unhealthy mother is said to be subject to colic, early eczema, stubborn diaper rash, pyloric stenosis, and multiple other abnormalities which "are clues to an eventual history" of asthma, hives, hay fever, hyperactivity, and perhaps autism; such a child craves sweets, becomes a rebellious underachiever at school, lacks the ability to concentrate, is subject to periods of excessive tiredness, and is characterized by emotional immaturity. Certainly no woman in her right mind wishes to bring into the world a child faced with years of such problems.

Any expectant mother with a history of allergies or other indications of adrenal exhaustion should adhere to the antistress program for at least one month. Fresh or desiccated liver, the richest source of antistress vitamins, should be eaten at every meal. Six small meals should be had daily. If indigestion and food allergies are problems, tablets of digestive enzymes and hydrochloric acid can be taken temporarily at each meal. When such a program is carefully followed, satisfactory improvement is usually noticeable by the end of a month.

Foods to emphasize. If at all possible, grow your own fruits and vegetables on naturally mineralized, composted, and mulched soils free from chemical fertilizers and poison sprays. If you cannot grow such foods yourself, try to purchase them. When you can, buy medically certified raw cows' or goats' milk or other safe raw milk; or keep a cow or goats and produce your own dairy products. Search for meats from animals whose growth has not been forced by stilbestrol or whose forage has not been covered with poison sprays. Select breads and cereals made from entire grains and which show "100 per cent" on the label. Such foods, when well prepared, can be delicious indeed.

CHAPTER TWELVE

Control Your Weight Wisely

A heartbroken mother was telling me that her only child, a boy of four, was mentally so subnormal they were having to institutionalize him. She and her husband were college graduates; and they had wanted a baby desperately. "We think it's because the doctor made me restrict my diet so much during pregnancy," she remarked. "Yet I only weighed 120 pounds."

It is now realized that millions of American children are below par mentally and physically because expectant mothers have been kept on diets too low in calories during their pregnancies.

Big babies are healthier babies. Research shows that babies weighing 7½ to 8½ pounds are in general healthier, smarter, happier, blue-ribbon babies, far superior to those whose birth weight was 5½ pounds or under. There are, of course, many exceptions. When compared with thousands of tiny babies, however, few large ones are born prematurely, are stillborn or die soon after birth, have malformations or cerebral palsy, and/or are mentally retarded. For example, in the Harvard study cited in chapter 2, when the mothers' diets were excellent, their babies averaged 8½ pounds; their deliveries were relatively easy; and though several women gained as much as 40 pounds, none had toxemia or gave birth to a stillborn child. When diets were poor, however, 44 per cent of the women who gained less than 20 pounds developed toxemia; their deliveries were prolonged and difficult, despite the fact that their babies averaged under 6 pounds. Much other research reveals similar findings.

Follow-up studies show that 8½-pound infants, compared to 5-pounders, are more vigorous, active, and mentally alert; they are easier and more fun to care for; and they suffer far less from colic, diarrhea, anemia, infections such as pneumonia, and numerous other abnormalities.

Birth weight and intelligence. An unusually high percentage of infants born prematurely are mentally retarded (p. 42) and/or develop cerebral palsy, which most often strikes babies weighing 3½ to 5 pounds. Children born at term but with low birth weight, however, are often worse off than the premature ones; they have the same disorders but frequently more of them and more severe ones. Usually, the smaller the baby, the lower is the IQ; the tiny infants whose mothers smoked heavily during pregnancy are particularly harmed (p. 31).

During World War II, when diets, especially in Holland and Leningrad, were inadequate in calories, protein, and other nutrients, many thousands of low-birth-weight babies were born at term. The vast majority of these tiny infants ranged from being intellectually subnormal to severely retarded. Among underprivileged populations in the United States and elsewhere, diets are notoriously inadequate and low-birth-weight babies born at term are as inferior in intelligence as were those of wartime Europe. Furthermore, studies of the DNA content confirm the faulty brain development.

Unfortunately, countless thousands of mothers who could afford to eat as they choose give birth to tiny infants born at term; these small babies are far more often mentally retarded than are large ones. For instance, the heavier of twins of dissimilar weight at birth usually has the higher IQ; and when groups of identical twins are compared, the larger ones are smarter, whether born prematurely or at term.

Even small variations in weight at birth are associated with marked differences in intelligence. An investigation of matched pairs of children born at term showed that the birth weight of the brighter boys averaged 8.18 pound compared to 7.4 pounds for the less intelligent ones, an their IQ's averaged 121 and 70 respectively. The smarte girls had an average birth weight of 7.39 pounds compared to 6.38 pounds, while their IQ's averaged 124 and 67.

I find myself wondering about the birth weights of men who signed our Declaration of Independence.

Birth weight and maternal gain. The way to get these heavier, healthier, happier, smarter infants seems to be merely by allowing pregnant women to gain more than has been customary for many years. A study of the birth weights of 10,000 babies, sponsored by the National Institutes of Health in cooperation with several hospitals, showed that when women were allowed to gain 25 pounds or more during pregnancy, their infants weighed more at birth; and there were fewer premature births, stillbirths, and deaths soon after birth, and much better growth and performance during the first year.

Physicians at Johns Hopkins Hospital, making a computerized study based on 11,911 normal, full-term pregnancies, found that when women gained less than 30 pounds, 12 to 16.6 per cent gave birth to tiny weaklings; if they gained less than 20 pounds, the number of premature births more than doubled; and if they gained only 10 pounds, almost 100 per cent had inferior infants. Women who had been underweight before conception and failed to gain at least 10 pounds by the twentieth week of pregnancy produced a tremendously high percentage of babies who were congenitally deformed, had low birth weights, were stillborn or died soon after birth, or developed cerebral palsy; and the number of deaths doubled when the birth weight fell below 5½ pounds.

In contrast, of the expectant mothers who weighed 127 pounds or more at conception and gained at least 30 pounds during pregnancy, not one out of the entire 11,911 produced a tiny inferior baby. The infants' birth weights increased in proportion to the mothers' pregnancy gains, regardless of the mothers' earlier weight.

Without exception, doctors conducting such studies have emphasized the following point: "The traditional obstetrical practice of keeping weight gain to a minimum should be immediately abandoned."

Reasons for weight restrictions. Thirty years ago, women who gained excessively during pregnancy had a higher rate of toxemia and eclampsia than others who gained little. The reason appears to be that the diets of obese persons are usually deficient in most essential nutrients, though some women do become overweight by eating too much wholesome food. Malnourished obese individuals have the same problems during pregnancy, including toxemia, as other women whose diets are inadequate. The muscles of such women become weak, waterlogged, and infiltrated with fat; hence labor is difficult; and their infants, likewise suffering from endema, may weigh as much as 9 to 11 pounds. For these reasons, obstetricians understandably have great fear that a large gain will cause heavy babies and difficult births.

When reducing diets are adhered to during pregnancy, the gains are small and the infants' birth weights are low, but innumerable studies have shown that deliveries are difficult, painful, and prolonged. Pregnant women are now so malnourished that 50 per cent of them develop edema, which can be reduced within an hour by injections of human serum albumin, normally produced by good food. Conversely, women who were underweight before conception but who have gained 55 pounds or more had no edema, and with easy deliveries gave birth to large babies. If the diet supplies all the nutrients needed, toxemia, eclampsia, and oversized, waterlogged babies cannot result, regardless of weight gained. Yet the best of nutrition can never stimulate an infant to grow beyond its genetic potential.

A rapid gain of 3 to 7 pounds in a week indicates toxemia; such a gain can occur when almost no food is eaten and never results from a high calorie intake. Despite this fact, physicians often make no distinction between the weight increase representing growth of vital structures and that caused by the retention of pounds of waste-laden fluids.

The Committee on Maternal Nutrition of the National Academy of Sciences, made up largely of professors of nutrition, obstetrics, and pediatrics at outstanding universities, has pointed out that a pregnant woman seeking medical aid to help her produce a healthier, happier baby is often given advice which causes her child to be a weakling. They cite a study of expectant mothers in Iowa whose diets were somewhat deficient in vitamins A and C, calories, protein, calcium, and iron. Obstetricians, imposing dietary restrictions for the purpose of controlling weight, however, caused the diets of these women to become "significantly decreased" in all nutrients, especially in calcium, iron, and protein. The committee mildly concludes: "Such observations indicate that nutrition is neglected both in high schools and medical schools."

There is much damaging evidence that by recommending inadequate reducing diets, restricting salt intake, and giving diuretics and amphetamines, all with the intent of preventing normal weight gain, obstetricians not only are helping to produce weaklings but also are causing pregnant women to suffer from numerous abnormalties, including toxemia. Physicians who have studied this problem repeatedly warn their colleagues that "rigorous restriction of weight gain is not justified and can be harmful." They emphasize that reducing does not decrease toxemia; neither do large gains increase it.

Acceptable gains in weight. The Committee on Maternal Nutrition of the National Academy of Sciences suggests that obstetricians urge each patient to make the "normal physiological gain in weight" of about 25 pounds by allowing her to eat to appetite. Women given no weight restrictions have usually gained an average of 28 pounds during pregnancy, an amount considered by many doctors to be normal and to produce superior babies. A number of physicians recommend a minimum gain of 10 pounds during the first 20 weeks of pregnancy and of approximately a pound each week from that time on, making a total gain of 30 pounds.

An obstetrician who wants the women under his care to gain from 24 to 30 pounds, provided they do "no nonsense eating," has pointed out that expectant mothers gaining this amount are able to nurse their infants. Women allowed to gain only 15 pounds can secrete little or no breast milk. Approximately a third of the total weight gained, or 8 to 10 pounds, is stored for the sole purpose of being secreted during nursing.

The normal weight gain is usually accounted for as follows:

Weight of	*Gain in pounds*
infant at birth	7½
placenta	1½
amniotic fluid (baby's swimming pool)	2
enlarged uterus	2
increase in blood volume	4
increase in breast tissue	½
normal increase in body fluids	3
fat stored for nursing	8–10
Total expected gain	28–30½

Reducing diets are not recommended. Some physicians aware that bigger babies are smarter babies, still declare that reducing during pregnancy is harmless to the infant, provided the diet is adequate. Such a statement, however, appears to be untrue. In July 1970, the National Research Council sent out a news release concerning the danger of all weight restriction during pregnancy, especially for the adolescent expectant mother. Because such girls are themselves still growing, their nutritional requirements are tremendously high. Since they have neither money nor scientific knowledge, their nutrition is woefully inadequate. One study of pregnant teenagers from low-income groups in Chicago showed them to be living on soft drinks, potato chips, candy, ice cream, French fries, and bakery sweets. Others go through pregnancy without once having tasted milk, eggs, cheese, or meat.

The National Research Council's news release emphasizes that restricting weight is likewise particularly dangerous for underweight women, who make up a third of all prenatal patients. Furthermore, it states that there is "no advantage to be gained by prescribing weight-reduction regimens for obese patients during pregnancy"; and that if such women wish to reduce, *they should undertake it only after pregnancy has terminated.* Overweight women who have reduced "successfully" during pregnancy have been found to regain their weight six months later.

Because reducing during pregnancy can be so harmful to the infant, the reasons for such damage are considered separately.

Dangers of fat deprivation. If pregnant rats are kept on a fat-free diet, the brains of the young are severely damaged and their ability to learn is markedly decreased. Women bent on maintaining slender figures usually forgo fats. As we have seen, every cell in the body, particularly those in the brain, must have the essential unsaturated fatty acids (p. 90); and without fat, vitamins A and E cannot be absorbed, which damages the brain still more (p. 188).

Fat is also vitally important during pregnancy to make the absorption of calcium possible (p. 91). Young mothers, whose bones are still being mineralized, must have 1.6 grams (1,600 milligrams) of calcium per day (with vitamin D) for themselves; another 400 milligrams daily are needed by the fetus. Yet when college girls kept on an "adequate" reducing diet low in fat were given 860 milligrams of calcium daily, some absorbed only 60 milligrams. Since neither expectant mother nor baby can be healthy without adequate calcium being efficiently absorbed, all pregnant women, including obese ones, should have *a quart of whole milk daily,* in addition to calcium-magnesium supplements.

Brain damage from low blood sugar. Whenever calories are restricted, the blood sugar often falls below normal. The brain tissue of mother and infant alike can use only sugar for energy; and a severe drop in blood sugar is now known to damage an infant's brain at any time during pregnancy as well as after birth (p. 136). Pregnant women who suffer from hypoglycemia have a high percentage of mentally retarded children born at term. Autopsy studies of infants dying at birth whose mothers were on low-calorie diets show that no glycogen, or body starch, is stored. Unless fed immediately, a healthy baby born without glycogen would suffer brain damage the first day of life (p. 52).

Damage from induced protein deficiency. A pregnant woman may control her weight by eating little except proteins. If she is deficient in calories, however, the amino acids obtained from these proteins are converted into fat and sugar and used for energy regardless of how badly these nutrients are needed by the fetus. The end result is identical to being deficient in protein itself. Damage to brain tissue is marked unless all essential amino acids are readily available (p. 38). Retarded brain development results when amino acids in the blood fall below normal, whether because too little protein was eaten or because the large amount obtained was converted into calories.

Acetone excretion and intelligence. When a person eats little, the body obtains its energy largely from stored fat, though energy is normally produced by fat and sugar being oxidized together. When fat is burned alone, it oxidizes incompletely and leaves a residue of acetone and diacetic acids. Because women use acetone to remove nail polish, they can usually recognize its characteristic odor on the breath of almost anyone trying to reduce. Acetone is also thrown off in the urine and is detected by the routine urine analysis given women during pregnancy.

The effect of acetone excreted in the urine of several hundred diabetic women on their healthy, full-term infants was shown by tests of their children's physical and mental abilities at eight months, a year, and four years of age. In comparison to matched babies whose mothers had diabetes but excreted no acetone and to other youngsters having healthy, nondiabetic mothers, these children were slower in developing physically; their IQ's were 10 points lower, or 91.6 compared to 101.5.

The diabetic mother-to-be excretes acetone when she lacks the insulin necessary to utilize sugar. The woman who is reducing during pregnancy excretes acetone when she has avoided foods containing sugars and starches. In both cases, the presence of acetone indicates damage to the mental and physical development of the unborn baby.

Acetone is produced only when the blood sugar is low and the amino acids in the blood are being used not as building blocks for fetal development, but to supply energy. When pregnant rats are fed in such a way that the blood amino acids are low and acetone is formed, the young are small and have a reduced capacity to learn.

The doctors conducting these studies give this warning: "There is need to reconsider the advisability of imposing calorie restrictions on women during prgenancy."

Maintaining a slender figure. Most grandmothers can tell you that years ago pregnant women ate as they wished (fewer refined foods were available then than now), usually gained 30 to 40 pounds with each pregnancy, and produced healthy 7- or 8-pound babies. Many women grew plump through the years—most were excellent cooks—but obesity was by no means the problem it is today. The difference seems to lie in the fact that almost every woman nursed her infant for perhaps nine months.

The weight stored during pregnancy for the purpose of being secreted later in breast milk disappears quickly if an infant is nursed. When the baby is not nursed, however, this fat is held tenaciously, as if awaiting a nursing period still to come. A strict reducing diet may take it off, but it promptly returns. A doctor's dry-up pills are usually an assurance of obesity ahead.

Several obstetricians have reported that they ask expectant mothers not to be concerned about weight but to eat only health-building food throughout pregnancy; and that women who nurse their babies for six months or longer weigh the same, or less, at the end of nursing as they did at conception.

One young mother-to-be said to me frankly, "I don't want to put on weight, but the very idea of nursing revolts me." The cause of such a feeling can often be found and removed if a woman is willing to work with an understanding psychiatrist.

A little girl who has been repeatedly rejected when she desperately wanted love soon becomes afraid of warm, close relationships. As an adult, this individual has long since forgotten these painful disappointments, but they remain in her unconscious and cause great anxiety should she try to nurse her baby. Other women cannot nurse because they unconsciously identify with cold, rejecting mothers; one learns to be a good mother by having a good mother. Such emotional deprivations are usually impossible to cope with alone, whereas excellent psychiatric help can be tremendously rewarding.

If a woman does not want to nurse but is willing to make every effort to remain slender without continuous struggle, she could hand-express her milk daily. Granted, it would be a nuisance, but probably easier than a prolonged fight against obesity. Such milk could then be given to her baby or sold to a hospital.

Blue-ribbon babies produced. The Montreal Diet Dispensary at the Royal Victoria Hospital, under the guidance of Mrs. Agnes Higgins, has worked out a plan by which superior babies of the correct birth weight are being produced. Their dietitians have interviewed the 1,400 expectant mothers being studied, have assessed what each usually eats, and have recommended foods needed to supply adequate calories, protein, and other nutrients. With careful supervision and extra feedings and supplements, poverty-stricken mothers from the lowest income group—the very ones who usually produce children of inferior intelligence, smallest birth weight, and with the most congenital defects—are giving birth to heavier, healthier, smarter babies weighing up to 8½ pounds at term. The Montreal group has shifted the emphasis from "slim dieting" to encouraging their expectant mothers to gain at least 24 pounds; and because many women were severely underweight, they are often delighted with gains of 40 pounds or more.

Although the findings of the Montreal group are not yet tabulated, their success has already been so spectacular in reducing the death rate, increasing ease of delivery, and upgrading the health of newborns that the physicians working with the Dispensary feel that their method should be routine obstetrical care. Their results are especially remarkable because they are working with malnourished patients who frequently do not come to the clinic until their pregnancies are half over.

Weight control upward. The woman who needs to control her weight more than any other is one who was underweight at the time of conception. Usually her nutritional "debts" are already enormous. Calories and all available nutrients will be kept for herself until her own needs are met; not until then can any be shared with her growing infant. A little stored fat could prevent both food proteins and body proteins from being used as calories; thus it could protect the infant's brain. Unless the underweight mother improves her diet at all possible speed, her baby is almost certain to be difficult to deliver, premature or of low birth weight, stillborn, dull or mentally retarded, and physically defective; and her low-birth-weight infant runs 80 times more chance of developing cerebral palsy than does a larger child.

Before planning a pregnancy, therefore, a woman should make every effort to gain to her normal weight. If she has already conceived, the minute her appetite permits she should obtain at least 3,000 calories daily in wholesome foods, divided into 6 meals made up of whole milk, natural cheeses and nut butters, whole-grain breads and cereals, and the higher-calorie fruits and vegetables; and a half cup of wheat germ daily often helps one to gain weight.

Overweight before conception. The tendency is for the pendulum to swing from one extreme to the other. Even though attempts to reduce may harm the fetus, there is a vast difference between gluttony and good nutrition. Certainly there is no excuse to eat foods unnecessarily high in calories or devoid of nutrients.

Getting 6 meals daily, each supplying 20 grams of protein, helps to satisfy hunger, prevent gaining more weight, and build a healthy fetus. Pregnant women who were allowed to eat as they wished as long as they obtained 110 to 120 grams of protein each day gained an average of 8 pounds less than did expectant mothers eating only 60 to 70 grams of protein.

It is probably unwise to eat less than 1,800 calories daily. If you are tempted to restrict your weight, however, there are three musts which should be observed: drink whole milk between meals and at any meal which supplies no fat; be absolutely sure that you include at least a tablespoon of oil in your daily diet; and the more strictly you curtail calories, the more frequently you must eat to prevent a drop in blood sugar and blood amino acids. Besides having 6 to 8 small meals daily, keep a little fruit and milk beside your bed to eat when you awake at night.

Your diet need not vary from that recommended (p. 107), except that you should eat more vegetables which grow above the ground, more strictly avoid all junk food, and go easy on starchy foods, gravies, fats, and high-calorie fruits.

To maintain ideal weight. If your weight was ideal at the time of conception, an acceptable increase of 24 pounds does not mean that you are encouraged to gain 40 or 50. You should gain 10 pounds by the twentieth week of pregnancy and then approximately a pound each week. If your weight suddenly increases 3 pounds or more in a week, instead of attempting to reduce, as has usually been done in the past, immediately increase protein, vitamins B_6, C, and E, and other nutrients which prevent toxemia and act as natural diuretics (ch. 8).

The diet outlined for pregnancy can be followed without variation (ch. 11). Just as proteins should be counted to make sure they are adequate, so should calories be counted to see that you are getting approximately 2,200 daily.

Selecting a physician. Many obstetricians put such emphasis on weight restriction that women who have made normal gains are often afraid to go for checkups. Frequently, before keeping an appointment they fast or take strong cathartics and/or diuretics, thereby harming the growing infant. Since a good physician-patient relationship is extremely important, you will wish to select an obstetrician who does not impose harmful restrictions.

Local members of the La Leche League or the International Childbirth Education Association (ch. 15) can probably recommend to you a physician who emphasizes nutrition rather than weight restriction. Or, before selecting a doctor, you might phone several and ask how many pounds each encourages patients to gain; or ask this question at your first visit. A physician does not want an uncooperative patient any more than you want an inferior child.

The Committee on Maternal Nutrition of the National Academy of Sciences, referring to physicians' harmful use of diuretics, salt restriction, and the unjustified treating of anemia before it exists with large amounts of toxic iron salts, makes this statement: "Improved teaching of basic and applied nutrition in medical schools would help physicians give sound advice to their obstetrical patients."

Until such teaching occurs, despite the vast amount of research showing that big babies are better babies, many obstetricians will continue to limit weight gain during pregnancy. Furthermore, because of their lack of knowledge of nutrition, they are afraid that a diet containing eggs, whole milk, and liver will increase blood cholesterol, unaware of the fact that cholesterol can become excessive only when nutritional deficiencies exist.

Value of an informed public. I recently heard a physician remark that the best assurance of an improved practice of medicine was a well-informed public. Perhaps mothers who desire truly superior babies can convince obstetricians that weight should not be severely restricted, whereas physicians can still prevent weight gains from becoming excessive by discouraging the careless eating of junk foods.

CHAPTER THIRTEEN

For an Easier Delivery

A friend was telling me that her daughter had a new baby. "Her delivery was easy," she remarked. "Only in labor seven hours."

I was amazed that anyone considered seven hours of labor easy. In my opinion, labor should be measured in minutes, not in hours; and prolonged labor is typical of women whose diets have been inadequate during pregnancy. Despite the fact that millions of women suffer pain during labor, however, almost no research indicates which nutrients, if any, might reduce such misery. Nevertheless, certain nutrients may be of particular value at this time.

Calcium decreases the sensitivity to pain. It has long been known that calcium, if taken with fat and vitamin D to insure absorption, decreases one's sensitivity to pain. Fo example, calcium given for menstrual cramps usually stops the pain within minutes. Years ago, when fewer drugs were available, pain was often deadened by injections of calcium. At the time I was seeing the patients for three obstetricians, I often suggested to these women that they take with a glass of whole milk enough tablets to supply 2,000 milligrams of calcium between the time labor started and they arrived at the hospital. Many had easy deliveries and some declared that they experienced almost no pain. Most were convinced that the extra calcium had been helpful.

Vitamin E is also said to decrease the sensitivity to pain. Certainly it removes the pain from a burn or a bee sting, but how effective it is in decreasing the pain of labor I do not know.

There is always zinc ointment. Since it is now recognized that zinc deficiencies are common throughout the United States, a study of rats deprived of zinc during pregnancy is of interest. Animals receiving adequate zinc delivered each of their young in less than two minutes and usually in as little as 30 seconds. In contrast, rats allowed no zinc had prolonged and difficult labor; each of their young took 15 to 75 minutes to deliver; a large percentage of the young died within two hours; after much obvious suffering, many of the mothers also died; and the remainder could not nurse their young.

No one knows the amount of zinc needed during pregnancy, though the normal zinc intake has been suggested to be 10 to 15 milligrams daily. As much as 750 milligrams of zinc oxide or zinc sulfate have been given to humans daily for long periods with no signs of toxicity. If you have been unable to find a mineral supplement furnishing 15 milligrams or more of zinc daily, it may be wise to cover an area of your skin, perhaps an armpit, with a generous layer of ordinary zinc ointment each night for a week or two before your expected delivery. Zinc is said to absorb well through the skin.

Keep your muscles strong. Now is the time when your months of nutrition can pay off. The better your diet has been, the stronger are your muscles, and the shorter and easier your delivery will probably be. If you have been careless in your food selection, however, late improvement may still help. Have 6 small meals daily, each supplying 20 grams or more of protein. The muscles of animals deficient in protein during pregnancy become so weak that deliveries are both late and difficult. Animals not given the essential fatty acid develop such weak muscles that pregnancy is often prolonged; their labor was both protracted and accompanied by excessive hemorrhaging. When the magnesium in the blood is low, muscles also become weak and labor prolonged. Similarly, potassium is essential before strong muscle contractions can occur. Since excess salt causes potassium to be lost in the urine (p. 242), reducing your salt intake and increasing potassium-rich foods during the last two weeks of pregnancy may be wise.

Probably vitamin E is more important than any other nutrient in helping to make your delivery easier. The most common symptom of a vitamin-E deficiency in all types of experimental animals, including monkeys, is the extensive degeneration of skeletal muscles. A lack of vitamin E allows the essential fatty acids forming part of the cell walls to be destroyed to such a degree that the muscles become extremely weak. This weakness not only makes labor more difficult, but it may also prolong the pregnancy three weeks or more, causing the infant to be stillborn. Furthermore, studies of women whose pregnancies have been prolonged and/or their labor especially difficult show that the mothers and infants alike have been woefully deficient in vitamin E.

Even when vitamin E has been obtained throughout pregnancy, if iron salts have been taken simultaneously the vitamin is destroyed and the delivery is invariably difficult. Conversely, when 400 units of vitamin E—alpha tocopherol acetate—have been given daily to pregnant women and then these were compared to a control group whose diets were not supplemented, the women receiving the vitamin had greater muscular strength and much shorter and easier deliveries. Even when the vitamin was first taken after the infant was already overdue, the deliveries were easier and less delayed.

The elasticity of vaginal tissues. Another advantage of a generous intake of vitamin E shortly before your delivery is that it tremendously increases the elasticity and expandability of the vaginal tissues. Certain hormones, produced by the pituitary gland and ovaries only when vitamin E is adequate, cause this unusual elasticity to occur toward the end of a full-term pregnancy. Premature births are often extremely difficult despite the fact that the baby is tiny, partly because these hormones have not yet been produced and the vaginal tissues cannot expand without tearing.

Vitamin C is also essential to keep the vaginal tissues elastic. A lack of this nutrient can cause the tissues to tear easily, make more cutting necessary, and result in both hemorrhaging and lower resistance to the infections so often contracted at the time of delivery. Dr. Fred Klenner, a physician who has done almost thirty years of research on vitamin C, has long recommended that all pregnant women under his care take 10 grams (10,000 milligrams) of the vitamin daily. They obtained this quantity from a teaspoon of the inexpensive powdered vitamin C, or ascorbic acid, taken in liquid with breakfast and dinner. Dr. Klenner has found that the tissues of such women are so elastic that deliveries are easy; and that hemorrhaging, anemia, and stretch marks are greatly decreased.

Added dividends. It is well to remember that vitamin E reduces the chance of painful phlebitis (p. 59) which so often follows labor. The main advantage of obtaining this vitamin, however, is for the sake of the baby.

Vitamin E tremendously decreases the need for oxygen.

Unfortunately, because vitamin E does not pass readily through the placenta, all babies are born deficient in this vitamin, especially if they are premature. For this reason, their oxygen requirement is unusually high. Oxygen starvation at birth is a major cause of infant death, of cerebral palsy, and of brain damage and the resulting mental retardation. A minor oxygen lack at this time may cause damage which, though perhaps not obvious for five years or more, can interfere with learning ability and vocabulary building, the development of pleasant personality traits, and scholastic performance and general achievement. It is often pointed out that both cerebral palsy and mental retardation have increased steadily since vitamin E has been removed from our diets. Autopsy studies of newborn monkeys, deprived of oxygen only a few minutes, showed their brains to be "riddled with lesions"; they resembled the brains of infants dying with cerebral palsy or of oxygen starvation (respiratory distress). In a number of studies animals have been given less and less oxygen until the deprivation caused them to die; the animals allowed vitamin E have survived much longer without brain damage and on "remarkably less oxygen" than the controls given no vitamin E.

The analysis of the infants' blood shows that when 600 units of vitamin E have been taken daily during the last weeks of pregnancy and at the onset of labor, some of the vitamin crosses the placenta. If only 100 units of vitamin E are taken, however, none is found in the babies' blood. As little as 300 units of vitamin E, given at the onset of delivery, have reduced the incidence of infant deaths and the number of hemorrhages.

No one knows the amount of vitamin E needed at the onset of labor. When human volunteers have breathed a mixture so low in oxygen that they eventually became unconscious, 300 units of the vitamin daily caused them to suffer far less from oxygen deprivation and to maintain consciousness longer than when no vitamin E was allowed. Taking 100 units of vitamin E daily offered no apparent advantage. Probably 600 units or more of the vitamin daily would give the best results.

Last-minute preparations. For reasons not understood, the requirement for pantothenic acid skyrockets just before birth. Since an ample supply of this nutrient can protect you from the stress of the delivery, one might adhere to the antistress program (p. 110) at this time. It is also important to eat food supplying vitamin K, essential to prevent hemorrhaging in your newborn baby;

yogurt and a cooked green leafy vegetable daily can fulfill this need. Fruits and vegetables can supply potassium. If you have had any edema, it might be well to remember that your baby can be large, puffy, and waterlogged if you forget to take ample vitamin B_6. A hearty snack of whole milk, bread, cheese, and fruit at the beginning of labor could prevent your baby's blood sugar from dropping dangerously low (p. 118).

In addition to watching your nutrition, I hope you and your husband have been attending classes in childbirth education, and that your delivery will be the rewarding and fulfilling experience many women are now finding that it can be.

CHAPTER FOURTEEN

A Goal to Strive Toward

One hears repeatedly that parents want to give their children all the advantages they can. In the field of health, however, I find little evidence of either mothers or pediatricians striving to help babies reach their genetic potential. The know-how is available to develop physically and mentally superior children, yet this knowledge is not being applied. It seems to me that there is far too much tendency to settle for mediocrity.

What appears to be needed is a clear-cut goal to strive toward, or a standard one hopes to achieve. Such a goal could increase a mother's willingness to apply nutrition and help her to decide whether she wishes to breast-feed or bottle-feed her baby, and to reach dozens of similar decisions.

Settling for mediocrity. We have a delightful spot in our community which we call the "Parisian Sidewalk Café"; we usually go there for lunch of salads or sandwiches, and sit in the sun while visiting with friends. Almost daily I amuse myself there by watching children, dozens of them. Most are eating candy, sweet bakery rolls, or at best a white-bun hamburger, and sipping soft drinks. Rarely do I see one showing the earmarks of good health: attractive cheek color, erect posture, thick glossy hair, or normal bone structure. Growth is often stunted; many have head circumferences which are obviously too small. By talking to parents I know that allergies are rife, infections widespread, and school absenteeism high. Teachers tell me that IQ's have dropped during the past decades.

The people in our community would probably consider themselves to be upper middle class. Most of the parents have gone to college. The fathers are largely employed in well-paying jobs, and few of the mothers work outside the home. The majority of the youngsters have been raised on commercial formulas under the care of pediatricians whose own children are often ill. I have met these doctors socially; they are fine, intelligent individuals, often delightfully charming, though, as far as I can judge, the knowledge of many of them on nutrition is far from expert. Yet the mothers seem to have shifted the responsibility for their children's health entirely onto the shoulders of these physicians.

As we wait in line to check out at the produce market, I see what mothers are buying. At least half of their groceries are junk foods which cannot possibly build brain or brawn. One mother, buying six-packs of a cola-type soft drink, said to me, "I get the artificially sweetened because I know it's good for the children." Several times I have seen this soft drink being given to babies in nursing bottles; and I have repeatedly heard a parent urging a child to finish a soft drink: "You asked for it, and I'm not going to pay . . ."

One acquaintance was telling me that she slept late and let her son, a boy of ten, get his own breakfast. She added rather belligerantly, "Of course, I know you disapprove." This child, who was standing beside her, looks somewhat like a shriveled old man and is about half the size of a normal youngster of his age. His breakfast, if he eats any at all, probably consists of cold cereals and sweet bakery rolls. I happen to know that he already wishes he could play football. My reaction to his mother's remark was that it made not an iota of difference whether I approved or disapproved, but that the time would come when this boy would hate his mother for allowing him to grow up with a nearly deformed body. (A friend who allows no junk foods in the house has a beautiful eight-year-old son who loves to cook and often prepares breakfast for the entire family, but the only thing he can cook is wholesome food.)

Unfortunately, I find the same low standards of health obvious in our community in the many states and cities where lecturing takes me each year. Though I meet marvelous parents wherever I go, the over-all situation makes one feel that few parents care whether their children are healthy or not. Certainly there seems to be an ever-present willingness to settle for mediocrity.

Goals can be reached. Perhaps a goal of superior health is rarely selected because parents are not convinced that it could be reached; hence it is hardly worth working for. For example, I find that when sound nutrition is applied, the rewards are not expected but seem to come as a surprise. A friend who had followed an excellent diet during her third pregnancy writes me, "This baby is terribly healthy and chubby and prettier than the others. She's my largest baby yet, but the delivery was easiest and my recuperation fastest. I wonder how much this new twist on nutrition had to do with it."

I suspect the "new twist" had a great deal to do with it. Whatever nutrients are stored in a mother's body are usually depleted during the first pregnancy; hence the children of following pregnancies generally are progressively less healthy.

This element of surprise is expressed by a mother who writes that she thought her husband and three children were already healthy before she started applying nutrition. Her letter says, "The improvement has been fantastic. The children have filled out, and are much more attractive. Their hair is thicker. Colds and infections seem to be a thing of the past, and we all have twice as much energy on much less sleep."

A mother who was applying good nutrition to her five young sons cornered me after church. "Miracle of miracles!" she exclaimed. "The kids have stopped fighting. They can even talk in moderate voices. Our house has been bedlam for years, but now I think maybe I'll survive."

Her report reminded me of a study in which 800 to 1,600 units of vitamin E were given daily to mentally deficient boys. The children became quieter, brighter, more cooperative, and appetites and dispositions improved. One three-year-old, who had screamed most of his waking hours and could be fed only by stomach tube, ate willingly, asked for second helpings, and was so cheerful and happy that he soon became the best-liked child in the ward (so the report says). Other studies have had similar findings.

As in this study, marked improvement often follows some simple change in nutrition. If the diet were continuously adequate throughout the entire growth period, the result might be beautiful superior children with high IQ's. No one knows, because so few children have ever been given adequate diets.

Dispositions are related to nutrition. A doctor who is studying the effect of supplementing the diets of a group of children with one vitamin at a time told me in a surprised voice, "Vitamin C made the children markedly more sociable. They seemed happier."

Anything which makes individuals feel better probably increases both their sociability and their happiness. Scientists who have investigated primitive races living on unrefined foods have repeatedly stressed the pleasant dispositions, the cheerfulness and happiness evident among these people, even after such amazing feats of endurance as climbing over mountain paths for 20 miles in a single day.

Cheerfulness is still to be found in areas where no overprocessed American foods are available. A friend had just returned from a photographic tour of remote areas in India, where people ate the unrefined food they grew themselves. "I expected to find people starving," she exclaimed. "But instead, *they were so happy*."

A member of a ballet group, visiting us at the end of a world tour made for our State Department, told us, "The people of Afghanistan were our favorites. *They were so happy*."

We were fascinated by the report of acquaintances who for five years had lived in Iran, where the only refined flour available came from the commissary of the American Embassy. "Never once did we see crowded or crooked teeth," they told us. "There's no tooth decay. And we loved the people. *They were so happy*."

Though there are unquestionably countless unhappy people in the areas mentioned, it is important to realize that tempers and dispositions can be improved by an excellent diet. Our national malnutrition shows itself in the whining of the babies, the crying of the children, the heartbreaking unhappiness of the adolescents (which has played a role in drug abuse), and the irritability of all ages.

A standard of judgment. It seems to me a standard is needed which can be used in judging the degree of health one wishes children to achieve. For example, every stock breeder and every 4-H Club member who raises animals has extremely high standards he wishes to achieve: coats must be glossy, eyes bright, muscles firm and well developed; conformation must meet certain qualifications, and so on. At every cat or dog show, standards are equally rigid, and each exhibitor is continuously striving for excellence. Yet there are no such standards for babies and children. It is difficult to strive for excellence without having a clear-cut idea of what one is striving for.

A baby's developmental potential is probably limited far more frequently by faulty nutrition than by his heredity. Every child, however, is an individual, very different from all other children. Each must grow at his own rate; and there is little evidence that the rapid growth so often emphasized by pediatricians is even desirable. A mother who feels superior to another because her baby gained more or learned to crawl, walk, or talk earlier is generally using her child to build up her own weak ego rather than striving for excellence. A standard for judging children should be used not competitively but to measure a child's actual development against his own genetic potential.

Let us see what might be expected of a child who is given an adequate diet—as nearly as we know it—from the day of conception on.

Logical expectations. Scientific studies cited throughout this book indicate that a healthy newborn infant can be expected to meet the following conditions:

Be perfectly formed without defects
Hold his head erect
Focus his eyes
Sleep soundly
Cry little
Suck vigorously
Have a wide face, a semicircular dental arch, a low dental vault; a broad, barrel-shaped chest; and narrow hips

During his first year, he continues to sleep soundly, cry little, and eat with a good appetite. His progress may be somewhat as follows:

Facial development: broad, with width of bone between eyes and between eyes and ears; flat forehead, free from the slightest bulge; dental arch still semicircular; and dental vault still low (ch. 25)
Muscular development: chest held high; stomach flat; crawls on stomach from birth on; starts sitting with support at third to fourth month, without support at sixth to seventh month; creeps with stomach not touching the floor at about six months; walks at 12 to 15 months; by the end of the first year or earlier, he should be able to support his weight on a crossbar
Teething: varies, usually starting about the sixth month
Skeletal development: chest still barrel-shaped, as at birth; rib cage does not flare near abdomen; no enlargement of bones at wrists or inside knees
Hair: by end of first year should be thick and glossy
Skin: smooth, with a pink glow, a delight of texture and touch

Eyes: bright in color; alert; obviously observing all activities around him
Disposition: he smiles early, laughs aloud by the age of six months; his tears are rare and of short duration; he is neither irritable nor whiny, but relaxed and happy

During this first year he should be free of the following abnormalities:

"cradle cap"
colic
diaper rash
diarrhea
constipation
colds
infections
allergies
convulsions
eczema
indigestion
vomiting (as distinguished from spitting up)
offensive odor to stools
anemia
jaundice
thrush
prickly heat
impetigo

At no time has he needed or been given antibiotics, aspirin, tranquilizers, or drugs of any kind.

If a child is sufficiently loved so that no emotional problems hinder his growth, the number of ways he deviates from such a standard shows the degree to which his diet is inadequate. If it is kept continuously adequate as he grows older, however, his energy will seem boundless yet accompanied appropriately by quiet and relaxation. His bone structure will develop in the same genetic proportions shown in his baby pictures (p. 229). His dental arch will remain broad; hence his teeth are not crowded or out of alignment but are strong, beautiful, and relatively free from decay. His laughter is joyous; his ability to concentrate on work or study is enormous. Quite possibly he has a beartrap mind and a high IQ far nearer his hereditary potential than if his nutrition had been less superior.

The goal outlined here is no higher than the standard of perfection farmers and pet breeders expect of their animals. Any baby who meets such a standard is beautiful and delightful, with charms that do not stop.

A million-year-old heritage. As more and more women have substituted bottle-feeding for nursing, formula preparation has taken baby feeding away from mothers and put it into the "chemical laboratories" of the pediatricians. With this tragic rise in the authority of pediatricians—because they are untrained in nutrition—mothers have simultaneously lost faith in their own ability to be good mothers. Instead of relying upon themselves to protect their infants' health, they have shifted this responsibility to the nutritionally untrained physician, and in doing so, have unknowingly settled for mediocrity.

Every woman has a heritage of millions of years of good mothering which nothing can take away from her. This heritage gives her built-in instincts which make her the best possible mother to a loved and wanted infant. If this baby is to become a superior adult, these instincts must be relied upon, and the responsibility for the infant's health must again be shouldered by the mother.

CHAPTER FIFTEEN

Make Your Decision Early

It seems to me a woman having a baby today is wonderfully fortunate in many ways. For example, all over America soon-to-be parents are attending courses in childbirth education in which husbands are helping wives prepare for natural childbirth; thus drugs, which often damage infants, are avoided. In some cases, fathers are helping with the deliveries, allowed at long last to participate actively in this stage of the miracle of life and love.

An obstetrician once told me that if a man had several children but had helped to deliver only one, that one would always be his favorite. This same physician, who wanted every father to participate in the delivery, told me that the intense love he saw expressed between husband and wife at each childbirth made the drama of the best movies seem pale indeed.

If you wish to find where classes on childbirth education are being held near you, contact the International Childbirth Education Association, Box 5852, Milwaukee, Wisconsin 53220. You and your husband may also wish to read *Husband-Coached Childbirth,* by Robert A. Bradley (New York: Harper and Row, Inc., 1965), *Childbirth Without Fear,* by Grantly Dick-Read (New York: Harper and Row, Inc., 1959), and *Thank You, Dr. Lamaze,* by Marjorie Karmel (Philadelphia: J. B. Lippincott Co., 1959). Because of such books, one now hears frequently both of infants being born at home and of mothers returning home only hours after their deliveries. In either case, the babies are not separated from their mothers. No one can give them sugar water which, by causing a drop in their own blood sugar (p. 118), may damage the brain. When the infant is put immediately to the breast, his blood sugar is maintained at a normal level and the brain protected. Older children remaining with the family quickly share in the excitement of having a new baby; and again the proud husband's participation makes for a family unity impossible to achieve when the mother is not at home.

For women who prefer to remain longer in the hospital, the rooming-in facilities now available have the wonderful advantage that the baby, remaining with the mother, can be put to the breast soon and often. Natural childbirth, husband participation, and rooming-in are all so vital to an infant's welfare that a good way to select an obstetrician is by phoning your local hospitals to find which doctors insist that mothers have these advantages.

Nursing success is now assured. The mother of today is again especially fortunate because, if she wishes to nurse her baby, she has every chance of being successful. In the past, nursing failures have been dismally high, though during the years I planned diets for hundreds of pregnant women, almost every one of them told me she wanted to nurse her baby.

This amazing change from failure to success has been brought about largely by a group of remarkable women forming the La Leche League International. Each of these mothers has nursed her own children successfully, usually until the child has weaned himself. Together they have worked out successful solutions to innumerable problems which formerly caused nursing failures: caked breasts; inverted and/or cracked nipples; breast inflammations, infections, or abscesses; nursing after premature or Caesarean births; overcoming the effects of drying-up pills and/or oral contraceptives; and dozens of other problems which often baffle the nursing mother.

There are branches of the La Leche League throughout America. If you are even vaguely interested in nursing your baby, I would urge you to contact them *early in your pregnancy*. You can learn if a branch meets near your home merely by writing to La Leche League International, 9616 Minneapolis Avenue, Franklin Park, Illinois 60131. I have been fortunate in meeting with many of their groups, and more marvelous women would be difficult to find. Furthermore, when your baby is tiny, it is such fun to be with women who are interested in the same things you are: burps, color of stools, first smiles, a new tooth, and dozens of kindred subjects which fascinate you now yet may bore you five years later. The La Leche girls soon become fast friends who give you courage and moral strength to stand up to all who make recommendations not in the best interests of your baby.

I am told that 70 per cent of the women who attend at least three meetings of the La Leche League *before delivery* are successful in nursing their babies, and that the more meetings you attend, the easier your nursing becomes. You will also want to read much of the La Leche League literature, especially their book, *The Womanly Art of Breast-feeding*, edited by M. B. Carson. Other books available through the League can help make this period exciting and rewarding: *The First Nine Months of Life*, by Geraldine L. Flanagan; *The Experience of Childbirth*, by Sheila Kitzinger; *The Natural Childbirth Primer*, by Grantly Dick-Read; and *Childbirth Without Pain*, by Pierre Villay and associates. I shall always be grateful to Dr. Margaretha A. Ribble for her book *The Rights of Infants*, which added tremendously to my own joy of motherhood; I recommend it most heartily.

The La Leche League has been especially helpful to discouraged women who have repeatedly tried to nurse their babies and have failed.

Motherhood at its best. It is important to realize that breast-feeding is much more than a means of supplying nourishment. It is a form of mothering which brings lifelong happiness and security to the child and helps him to reach his genetic potential. This fact was stressed in an article I happened to read about the people in Okinawa. During World War II, they endured bombing for a time which was more severe than in almost any other part of the world. A large percentage of the Okinawans were severely wounded, yet they suffered without complaint. None had high blood pressure. None developed stomach ulcers. All showed an amazing ability to tolerate pain and at the same time to remain remarkably cheerful and happy. A group of psychiatrists, studying these people, concluded that such admirable characteristics were possible because each person, as an infant, had been given love and security while being nursed as long as he wished

For years I have been convinced that by watching children carefully, one can tell which youngsters have been nursed for several months. When a child is outgoing, happy, warm, friendly, healthy, and as cuddly as a kitten, you can be sure he was nursed until his emotional needs as an infant were fulfilled.

Prepare to meet discouragement. The expectant mother who wants to nurse her baby often meets discouragement on every hand: from relatives, hospital nurses, and even pediatricians. Every medical journal the pediatrician picks up is full of ads for prepared formulas, bottles, sterilizers, and various paraphenalia designed to make money by preventing you from nursing. Such advertisements assure your physician that prepared formulas are nearly identical to mothers' milk, a statement which is absolutely untrue. Convincing salesmen from pharmaceutical houses, again wishing to make money with little regard for your baby's health, confirm these assurances and repeat them so frequently that even well-trained physicians usually accept them as fact. Furthermore, pediatricians receive far more training in drying-up techniques and in mixing formulas than in helping a woman to breast-feed. Both pediatricians and hospital nurses often have such a negative attitude toward breast-feeding that mothers have become discouraged. Only 25 per cent of infants are now being nursed as long as five days. Fortunately, the La Leche League is doing much to rectify this deplorable situation.

If you do wish to nurse your baby, let your local La Leche League help you select a pediatrician who is sympathetic to breast-feeding. When a doctor's own children have not been nursed, there is little chance that he can help you with your nursing problems. The La Leche League will assign to you a woman who has nursed her own babies successfully and who can help you over any rough spots.

There are many advantages. There is no question but that breast milk produced by a healthy mother is nutritionally far superior to any formula. There are, however, many other advantages in nursing rather than bottle-feeding: breast-feeding is easier in that there are no bottles to wash and sterilize, no formulas to prepare or heat in the middle of the night; the food supply is always convenient, constantly available, and at the correct temperature; nursing becomes a time of rest, reading, or visiting with friends over the phone; also, nursing is cheaper in that no money is spent on bottles, formulas, or sterilizers; and during night feedings, the baby can be taken into bed and both mother and child can go back to sleep together. Furthermore, women who nurse their babies experience less hemorrhaging; and fewer of them develop breast cancer later.

It is said that nursing "gives the baby to the mother," in contrast to the formula-fed infant, whom anyone can feed; thus nursing gives a greater sense of fulfillment. Most important of all, however, are the facts that mother and child are nearer and dearer to each other and that the children themselves grow up to be happier, warmer, friendlier, more stable individuals.

To nurse or not to nurse. The La Leche League points out that no woman should be urged to nurse her baby if she does not wish to do so. I admire this mature attitude, but I find myself disagreeing with it. If you have not yet reached a decision, I beg you to keep open-minded and consider nursing, at least for a short time.

Through the years I have heard literally hundreds of women express regret that they had not nursed their babies; they somehow feel that life has cheated them. "I wanted to so much," they have told me, "but . . ." Perhaps they describe how relatives, nurses, or doctors discouraged them, or tell of being given dry-up pills, or of a baby so satisfied by sugar-water feeding that he would not suck. These women could have nursed had they been given help. I have even known a few women who so bitterly regretted having bottle-fed their babies that they had another child whom they nursed until it was self-weaned. Without exception, such mothers wish that someone had urged them to nurse their older children.

The breast-fed infants have amazingly high resistance to infections. I suspect any worried mother, up at night with a sick child, might wish someone had influenced her to nurse that baby.

Allergies are almost unknown among breast-fed infants but develop in 66 percent of our bottle-fed babies. Only yesterday I saw a mother whose 14-year-old daughter has suffered from asthma since early babyhood. I asked her approximately how much they had spent on medical bills because of this allergy. Without hesitation she replied, "At least fifteen thousand dollars. Probably more." I suspect she might wish someone had talked her into nursing this daughter.

Crib death, which takes the lives of some 20,000 seemingly healthy infants each year, does not occur among babies who are breast-fed. Surely each heartbroken mother who has suffered such a loss must wish someone had influenced her to nurse her baby.

The advantages of breast-feeding are too numerous to be passed over lightly. Our country needs more happy, stable children and more fulfilled, contented mothers.

Make your decision. I recently talked with three young mothers, all of whom said they had wanted to nurse their babies. One had not tried because she was taking oral contraceptives; another considered her nipples to be inverted; the third had given up because her milk flow had decreased with early introduction of solids. Had these girls joined the La Leche League early in pregnancy or read their literature, each of them would be nursing her baby now.

Successful nursing depends on knowing the solution to a problem before that problem arises. The La Leche League has those solutions.

CHAPTER SIXTEEN

Advantages of Nursing

A survey of 1,904 hospitals, collectively discharging more than 500,000 babies annually, showed that less than 16 per cent of these babies were being nursed at the time they were taken home; and most of this small group of infants were bottle-fed within a few weeks. Mothers are repeatedly assured that there is nothing to be gained by nursing because formulas are as good as breast milk. The very pediatricians who make this gross misstatement usually have an office full of unhealthy-looking babies awaiting antibiotics or allergy shots. Fortunately, the more intelligent, highly educated young mothers are now nursing their babies despite every opposition.

Emotional needs last a lifetime. To a person, the doctors who have done research on nutrition stress the superiority of breast-feeding over the giving of a formula. Yet nursing is as important psychologically as it is physiologically. The child who has not been nursed unconsciously feels a lifelong rejection, knows less security, and has more difficulty in adjusting as a social being. He unconsciously harbors hostilities toward his mother which prevent a close relationship between the two.

A prominent psychoanalyst once said to me, "The most destructive factors in our culture today are those influences which prevent a mother from nursing her baby." He pointed out that a newborn kangaroo, only 1 inch long, climbs hair over hair some 2 feet to reach a nipple to which it clings; and that the same instinct which prompts this inch-long bit of life to make such a hazardous journey is in every infant.

The desire to be put immediately close to the mother and given the breast makes a permanent record in the brain and, though it is consciously forgotten, it can never be erased. For this reason, unconscious attempts to fulfill this desire can last a lifetime. Thus the deprivation often causes compulsive eating, drinking, and smoking, and results in obesity and alcoholism. It can take the form of psychosomatic illnesses such as arthritis or asthma. Certainly it plays a role in such social problems as crime and drug addiction. There are, for example, fewer child delinquents among children who have been breast-fed than among bottle-fed ones. Furthermore this deprivation takes its lifelong toll in decreased ability to give and receive warmth and love. Dr. Margaret Mead has pointed out that babies who are not nursed have serious difficulties later with sex relations.

Although the advantages of nursing were touched on lightly in the last chapter, let us now see what scientists have found them to be.

The exceptionally bright children. In a study of exceptionally bright children, it was found that not one youngster with an IQ of 130 or higher had been bottle-fed. Most of these children had been nursed four to nine months and some of them longer. Of the children with an IQ of 120 or above, 95 per cent had been breast-fed, many for ten to 15 months. Other studies have shown that children who have been breast-fed achieve higher scholastic standing than those given formulas.

Children should be beautiful. I have been repeatedly impressed by the gorgeous, smiling babies seen in every European country and in the Orient. Almost without exception each child is beautiful. In contrast, the pinched, pale, unsmiling, narrow faces of American babies break my heart. In all other countries except ours, most babies are nursed. Since the Oriental children are given little or no milk after weaning and the European youngsters are allowed wine instead of milk, such beauty is often not permanent.

Beauty in girls and handsomeness in boys depends very largely on bone development, which determines facial and body structure. Because calcium is more efficiently absorbed from breast milk than from any type of formula, breast-fed babies usually have much the better bone development. Narrow pinched faces, crowded teeth, sloping or bulging foreheads, a near absence of chin, rounded shoulders, and hollow chests, all of which can result from inadequate calcium absorption, do not increase attractiveness.

In one study, careful measurements were taken of the facial bones of 327 persons, and their skeletal structure correlated with the length of time each had been nursed. Individuals having never been nursed had the poorest facial development; persons who had been nursed only three months had facial structure superior to theirs. The longer nursing had continued, the more superior was the facial development. These scientists stressed that even after the age of 25, the advantage of being nursed was still obvious. They concluded: "Nursing in the first six months can control a person's facial contours for the rest of his life." They bring out that, aside from the nutrients in the milk itself, a breast-fed baby must work harder for his meals; thus he exercises his facial muscles and develops them more than do bottle-fed babies.

Athletes in the making. It has been brought out that an infant given high-quality breast milk for six to nine months can hold his weight on a bar and is an athlete in the making. His broad chest gives him a greater capacity for oxygen; his superior facial development, with wider sinuses and nasal passages, allows excellent drainage and greater facility in breathing, advantages which will last him throughout life.

The reducing problem solved. The breast-fed infant may weigh the same as a formula-fed baby, yet more of his weight is muscle, vital body tissues, and bone. Wholly breast-fed babies do not become blubbery as infants. Furthermore, these fortunate individuals are rarely if ever obese as adults. Since breast-feeding lost its popularity, obesity has become a national problem, with some 80 million miserable Americans each hating his excess fat. For this reason alone, nursing should certainly be encouraged. Furthermore, nursing usually solves the reducing problem for the mother (p. 119).

Those unnecessary infections. I know of few joys greater than having a laughing, happy, good-natured baby, or of worse anxieties than caring for an ill one. Hundreds of studies have shown that breast-fed infants are far healthier than formula-fed ones. A classic among these studies involved 20,000 infants under one year of age. The bottle-fed babies suffered twice as many infections as did the breast-fed infants; their illnesses were far more serious; and ten times more of them died. Of the infants who suffered acute infections, 96.7 per cent had been bottle-fed and only 3.3 per cent breast-fed.

In a similar study of 1,500 sick infants, four times as many of the bottle-fed babies suffered from acute infections as did the breast-fed ones. Even infants who had been breast-fed only six weeks showed twice as much resistance as did bottle-fed babies. Again, the infections suffered by the bottle-fed babies were far more serious than those of the breast-fed infants. Almost every bottle-fed child suffered from respiratory infections and infections of the middle ear and sinuses.

Babies who are breast-fed rarely have infections in the intestinal tract serious enough to cause diarrhea and hospitalization, so common among bottle-fed infants. In fact, one pediatrician was impressed by the large number of infants she saw with enteritis, or inflammation of the intestines. Upon investigation she found that babies who had been nursed for only a month recovered quickly, whereas 70 per cent of the bottle-fed infants became seriously ill and several failed to recover. In going over her records, she found that for every ill breast-fed baby, she saw six who had never been breast-fed. She pointed out that one reason she and her fellow pediatricians were not more insistent upon breast-feeding was that they saw so few breast-fed babies that they failed to realize how superior these babies were to the bottle-fed ones.

Immunity served at every feeding. Whenever a mother suffers from an infection or disease or is even exposed to an infection, her liver produces protein substances known as antibodies. From that time on, these antibodies circulate in her blood, combine with and/or destroy viruses and bacteria gaining access to her body, and thus prevent illness. Breast milk, therefore, formed as her blood circulates through the mammary glands, contains human antibodies in proportion to the number and kind in her own blood serum. When various types of vaccines have been given to nursing mothers, their own antibody production is immediately stimulated; and antibodies to the illness the mother was vaccinated against, like polio, for example, are quickly secreted in her milk.

If a baby is so fortunate as to be nursed through most of his first year, he is continuously supplied with antibodies which he himself has no possibility of producing unless he is first exposed to each specific type of disease-producing bacteria. Such antibodies give him a lifelong resistance to any illnesses to which his mother has built an immunity. Thus does breast milk supply antibodies capable of fighting innumerable human infections and diseases. These antibodies to human illnesses can never be found in cows' milk.

Despite the statistics, I have known physicians to argue that bottle-fed babies do not have more infections. Before taking their comments seriously, try to find a year-old bottle-fed child who has not been given an antibiotic.

Off to a good start. Since healthy babies are much easier to care for than sick ones, for your own sake, if not for your infant's, see that your baby gets the milk secreted during the first five days. This milk, known as colostrum, is such a nutritional powerhouse that the infant not given it becomes by contrast a disadvantaged child. Through the eighth month of pregnancy many women secrete a considerable amount of colostrum, which can be hand-expressed and frozen for later use. If you do not wish to nurse your baby at any other time, getting him off to a good start by giving him colostrum decreases medical expenses, saves extra work on your part, and usually prevents the heartbreak which can occur should your baby become ill.

Colostrum averages six times more protein, five times more vitamin A, 12 times more carotene, seven times more vitamin E, and three or four times more antibodies and antitoxins than does breast milk secreted later. It also supplies comparable quantities of other nutrients. Because infants store little or no vitamins A and E before birth, the high content of these vitamins in colostrum is particularly important in preventing such infections as bronchitis and pneumonia, which cause the death of many babies during their first month of life. Failure to give colostrum, therefore, is a form of unnecessary cruelty to a tiny human being.

Where allergies are unknown. Babies who have been wholly nursed for six months or longer rarely develop allergies. I read in a delightful report of a conference on allergies that a visiting physician could not understand what the American pediatricians were talking about. He himself was a child specialist and had practiced for many years. The reason for the confusion was that the visitor came from Finland, where all babies are nursed and allergies appear to be unknown.

One study of 1,377 allergic children showed that the shorter the time the baby was nursed, the higher the incidence of allergies, even in the absence of allergies in the family, and the longer these allergies persisted, which was usually five years or more. Many studies have confirmed these findings. Some doctors have even pointed out that allergies have increased proportionately to the decrease in nursing. Conversely, allergies rarely develop in a potentially allergic child (with allergic parents) if he is nursed for a prolonged period.

Eczemas caused by allergies are also found to be some four times as frequent in babies who have never been breast-fed as in those even partially breast-fed. Many eczemas, however, are caused by a lack of essential fatty acids, which are four to five times richer in breast milk than cows' milk.

Unharmed by heat. The striking advantages of unheated milk over boiled, pasteurized, dried, and canned milks were shown by the late Dr. Francis M. Pottenger, Jr., then professor at the University of Southern California Medical School. When cats, which he used as experimental animals, were given raw milk, they were healthy, beautifully developed, vigorous, and had excellent bone structure and thick shining coats. By contrast, the cats receiving heated milk had infections and continuous drainage from underdeveloped chests and sinuses. They were infested by ticks, lice, and intestinal parasites which raw-milk-fed animals did not have. Their teeth were crooked, irregular, and crowded into narrowed jawbones, often protruding laterally. Their entire faces and skulls were markedly narrower and smaller; and each generation became progressively worse. Later mineral analyses showed that the bones of raw-milk-fed cats contained 12 to 17 per cent calcium, whereas the bones of first-generation animals receiving heated milk contained only 3 to 7 per cent calcium and of the second generation, 1.5 to 3 per cent calcium. Such bones, said to be like sponge rubber, were porous and frequently fractured spontaneously. When pregnant cats were fed only heated food, deliveries of their kittens became progressively difficult, and many mothers and young alike died during labor. The thyroid, adrenal, and sex glands of cats given heated milk became abnormal; the animals lacked sex interest; and eventually 83 per cent of the males became sterile. The longer the milk was heated and the higher the temperature, the more degenerated became the animals receiving it.

After seven years these experiments were completed. Soon a luxuriant growth of huge, intensely green weeds sprang up in the abandoned pen where the raw-milk cats had been kept. In contrast, weeds in the pens of the animals that had been given pasteurized, evaporated, or other heated milk were small and had poor color. Dr. Pottenger then had beans planted in both cages. The plants growing where the raw-milk-fed cats had been kept were fully six times higher than in the other cage. More than any other one fact, it was the excellent motion pictures taken throughout these experiments which have made physicians in Southern California fight to preserve our supply of safe, medically certified raw milk.

There appear to be many reasons why heated milk is inferior to unheated. Heat causes minerals to be made less soluble and many to be deposited in the pipes through which pasteurized milk must pass. A number of valuable enzymes, especially phosphatases, which help to mineralize bones, are destroyed by the heat. Furthermore, heat causes unsaturated fatty acids in milk to become denatured. Hormones secreted in raw milk, particularly the steroids from the adrenal glands, which help to prevent allergies, are likewise inactivated by heat; and the essential amino acid lysine is harmed, especially by the high temperatures used with certain dried milks and evaporated milk. Boiled human milk has lost much of its value and cannot protect an infant against infections as does raw breast milk.

Surely every expectant mother who could see Dr. Pottenger's pictures would want her baby to have her own safe raw milk rather than some heat-treated variety.

Other advantages of breast-feeding. There are numerous nutritional advantages in breast-feeding often overlooked by pediatricians. For example, the intestinal bacteria of breast-fed infants produce so many B vitamins that babies who are nursed rarely lack these nutrients. For the same reason, their stools do not have an unpleasant odor. Unless the mother herself is deficient, breast milk contains far more vitamin C and about eight times more vitamin E than does cows' milk or prepared formulas. Linoleic acid, essential in building every cell in the body, is many times richer in breast milk than cows' milk. The blood of breast-fed babies contains much more magnesium than does that of bottle-fed infants; by the third day of life, the formula-fed baby is already low in magnesium. Compared to cows' milk, breast milk is higher in calcium and lower in phosphorus, a condition which increases the absorption of calcium, magnesium, zinc, and other minerals. Partly for this reason, breast-fed infants are less nervous, tense, high-strung, jerky, and sensitive to noise than are most bottle-fed children; they are less susceptible to convulsions; and they sleep longer and more soundly. Breast milk also contains only one-fifth as much salt (sodium) as does cows' milk, an advantage which now appears to insure better health throughout life.

The reason for confusion. Certain companies make millions upon millions of dollars annually by selling infant formulas. These vast profits are possible only because pediatricians are so flooded with propaganda that some become willing to recommend an inferior product instead of a superior one. Perhaps if medical schools ever require pediatricians to study nutrition, this deplorable situation may change.

If by now you have decided that you wish to nurse your baby, however, relax as never before, know that success can be yours, and do not let anything or anyone discourage you.

CHAPTER SEVENTEEN

Maintaining Breast Milk of High Quality

The famous anthropologist who has studied primitive races throughout the world, Dr. Margaret Mead, says that she has never heard of a native woman unable to nurse a baby. It would appear that all breasts can be functional.

More than any other one factor, the success of breast-feeding depends on how frequently the baby is allowed to suck. Physicians sympathetic to nursing agree that an infant should be put to the breast immediately after birth, even while the mother is still on the delivery table; and that the more often the baby nurses, the greater is the milk supply.

Sucking is so essential to stimulating milk flow that anything which decreases it may spell nursing failure. For example, sugar water given in hospital nurseries can ruin the appetite and make an infant too sleepy to suck vigorously. Furthermore, oral glucose feeding or infrequent nursing may cause such a drop in blood sugar that permanent brain damage can result. By all means ask your obstetrician and/or pediatrician to see that no such feedings are given your child. The mother who is most successful at nursing is a happy, relaxed, calm individual who worries none at all about the housework. Who cares if the dirt is swept under the bed or if paper dishes are used temporarily? An overbusy, impatient, or resentful mother allows her baby far too little time to stimulate milk flow.

All babies should, of course, be kept on a demand schedule and fed whenever hungry. Such infants gain better, cry far less, allow both themselves and their mothers to remain more relaxed, and soon set up a meal pattern of every three or four hours.

Frequent sucking pays dividends. When I first wrote this book, I reported articles from the medical literature which

I feared no one would believe; I am not sure I believed them myself. One was of Mundugumor women in New Guinea who, though they had never been pregnant, often adopted young infants and, by allowing them to suck all they wished, were able to secrete enough milk to feed them. The other report told of peasant women in Sicily who were able to nurse infants even though they themselves had not been pregnant.

During the past year I have talked to two American girls, corresponded with three others, and read in the *La Leache League News* of still more who have successfully nursed adopted babies. A few had previously nursed children of their own, but most have never been pregnant. With the patience of saints, these women had put their babies to the breast and simultaneously kept a cup of formula in warm water at their elbows; the formula was dropped by medicine dropper onto their nipples whenever the baby appeared to be about to give up sucking. Usually their own milk did not come in for ten days to two weeks. The amount of breast milk increased rapidly thereafter and the formula was discontinued. One woman who had never been pregnant told me that at the end of the first month she secreted 32 ounces of milk daily; and that her supply had continued to be ample until her baby had weaned himself at two years of age.

The same procedure has sometimes been followed by women who have not nursed their babies immediately after birth but wished to do so later. In this group are mothers who were convinced they could not nurse because of being given dry-up pills in the hospital (such medication prevents uncomfortable engorgements, but does not stop milk flow); women who wished to take oral contraceptives, which do decrease the milk supply at first but do not prevent successful nursing; and mothers whose premature babies have been kept in incubators or whose nursing has been delayed because of Caesarean births, phlebitis, or other illnesses. In many such cases, milk can be hand-expressed daily and given the baby immediately or frozen for later use.

Several times recently I have talked with mothers who sincerely wished to nurse but whose milk had largely dried up soon after solids were introduced. I convinced them to discontinue solids and to give nothing but breast milk, nursing their babies whenever they were hungry. After three days of doing little except nursing, each woman had all the milk her baby could take. Not infrequently babies are unable to tolerate formula after formula because of digestive disturbances or allergies. Even when such an infant is four or five months old and has never been nursed, the mother can establish the flow of breast milk if she wishes to do so. The *La Leche League News* has told of a number of remarkable mothers who have successfully nursed twins without any supplemental formulas and of other women who have simultaneously nursed two babies who were not twins.

Frequent sucking can keep the milk supply ample. The mother can see to it that her milk is of high quality.

Improving quality. Because quality depends on the mother's diet, breast milk is not always superior to a well-planned formula. For example, studies show that when nursing mothers are on an extremely low protein diet, the growth of their infants is stunted and their brains damaged. Similarly, when rats are given a low-protein diet during lactation, the protein content of the milk drops to half. Their young have a decreased ability to learn maze running and to avoid pain; they lack "exploratory curiosity" and, compared to the young of well-fed mothers, are "markedly inferior."

I frequently hear American girls say they stopped nursing because their milk was so thin and blue that their babies did not gain readily; and that their pediatricians declared their milk to be of poor quality. Except for colostrum, or the first milk flow, good breast milk is always thin. The amount of vitamin B_2 it contains gives it the blue color. In comparison to the pudgy babies fed formulas high in sugar—future fatties in training—a breast-fed infant does gain more slowly. Though this slower gain is normal and healthy, it often worries the pediatrician, who is unaccustomed to seeing truly healthy babies. If the mother's diet is good, the quality will be excellent.

The higher the mother's intake of protein, unsaturated fats, minerals, and vitamins, the more of these nutrients found in breast milk. If she takes vitamin B_6, for example, her milk will contain approximately four times more of this vitamin than it would without the supplement. Similarly, the vitamin-A content of breast milk is considerably increased if the mother takes daily 25,000 units of the vitamin, though smaller amounts show little effect. She must take at least 300 milligrams of vitamin C daily before her milk contains enough to meet the infant's minimum requirement. The amount of vitamin D in breast milk probably varies with the mother's exposure to the summer sun; it is sometimes adequate, but usually none of this vitamin is found unless the mother takes a vitamin-D supplement.

In contrast with cows' milk, which contains little or no vitamins E and K, breast milk can be a rich source of both, provided the mother gets enough of these vitamins in her own diet or has favorable bacteria growing in her intestines which can synthesize vitamin K. Some breast milk contains no vitamin K, but if a woman eats cabbage (preferably as cole slaw) or spinach, the two richest sources, or takes yogurt in generous amounts, her milk will supply this vitamin. The vitamin-E content of breast milk is in proportion to the mother's intake, provided she avoids iron salts (p. 68). The iron supplied by liver, eggs, yeast, and wheat germ cannot harm vitamin E.

The average breast milk contains too few B vitamins to meet the optimum requirements of a baby; the mother's needs appear to have priority over those of her infant. If the nursing mother has yeast, wheat germ, or liver daily, however, the amount of B vitamins, particularly biotin inositol, and pantothenic acid, in her milk can be markedly increased. The most dependable sources of B vitamins for a breast-fed infant are those synthesized by intestinal bacteria.

Little iron is found in either breast milk or cows' milk. That supplied in breast milk, however, is absorbed far more efficiently than is the iron in cows'-milk formulas. If the mother's prenatal diet has been adequate, a full-term baby has stored so much iron that he needs little in his diet until he is six months old.

Usually, if nutrients are not supplied in the mother's diet, they cannot be secreted in her milk. Calcium and phosphorus are exceptions, because they can be obtained by the demineralization of her bones. Dozens of studies have shown that the nursing mother is generally in what is spoken of as negative calcium balance, meaning that more calcium is excreted in her breast milk and in her urine and feces than is supplied by her diet. The deficit is made up with calcium stolen from the bones. On the other hand, if a mother obtains sufficient calcium in the form of milk, cheese, and supplements, her teeth and bones can be protected, and the amount of calcium in the breast milk can be slightly increased. Her calcium requirement, however, is higher than at any other time in her life. Because this need is rarely met, women who have had several children usually suffer from osteoporosis later in life. It is, therefore, even more important to take calcium supplements while you are nursing than during pregnancy.

Eating refined starches and sugars increases the saturated-fat content of breast milk but decreases the quality and quantity alike. Foods high in solid fats also increase the saturated-fat content, whereas salad oils increase the essential fatty acids.

Stimulating quantity. The quantity of breast milk secreted is in proportion to the amount of protein and B vitamins the mother obtains. If her diet is adequate and is high in protein and these vitamins, the output of milk then appears to be limited only by the time the baby is allowed to suck.

An adequate diet for a nursing mother is essentially the same as that needed during pregnancy (ch. 11). The requirement of B vitamins during lactation, however, may increase as much as five times over the amount usually needed; the calcium requirement doubles or triples; and the protein increases by at least 50 grams daily. To obtain such quantities becomes an almost superhuman feat.

Contrary to popular opinion, drinking excessive amounts of water, tea, coffee, soft drinks, or other liquids does not increase the quantity of milk. The liquid requirement remains about 3 quarts daily. Drinking a quart or more of fresh whole milk and/or pep-up daily supplies liquid and calcium and increases the protein and vitamin-B_2 content of breast milk.

A B vitamin, inositol, supplied by yeast, liver, wheat germ, and unrefined corn syrup, was found to stimulate milk production in rats so remarkably that it was at first labeled the lactation vitamin. A teaspoon of inositol, a sweet, pleasant-tasting white powder available at health-food stores, might be advantageously added daily to a quart of pep-up.

The belief that beer stimulated the flow of breast milk was valid when brewers' yeast was left in it; thus it supplied B vitamins, protein, and liquid. Some imported beer has about 2 tablespoons of yeast in each pint bottle, but refined American beers offer only calories. Since food yeast is 48 per cent protein, furnishes the B vitamins, and is customarily taken in liquid, it can serve as a substitute for old-fashioned beer.

Years ago I lived next to a young woman who sold breast milk to a hospital. When she took 3 heaping tablespoons of yeast daily, she was able to sell 30 ounces or more over that which her own baby could drink. She hated the taste of yeast, however, and time and again would fail to take it; on the following day she would invariably have no milk to sell.

The quantity of breast milk will decrease almost immediately after solids are introduced (p. 151). Many studies show that nothing is to be gained by giving food other than breast milk until your baby is six months old.

DDT in breast milk. Reports that breast milk contained more DDT than cows' milk caused much anxiety among nursing mothers. These reports failed to say that the level of DDT allowed in cows' milk was unusually low and that cattle had a high capacity for breaking down and excreting DDT.

The consensus of scientific opinion is that the DDT in breast milk does not justify putting a baby on a formula. The amount of DDT a nursing infant might obtain in a day appears to be only a small fraction of that absorbed daily without recognizable toxicity by adults working for 25 years in plants where DDT is made. No information is available as to infants' tolerance for DDT. Newborn rats, however, are 20 times more resistant to the pesticide than are fully grown animals; during the nursing period, the young remain twice as resistant, and they are still slightly more resistant after being weaned.

In 1970, the Food and Drug Administration reported that milk may contain a substance, coming from plastic containers, which is said to be harmless but which can be confused with DDT. It therefore appears that the reports of DDT in breast milk may not have been accurate.

Your diet during lactation. While you are nursing, your diet can remain the same as during pregnancy except that you will need to eat daily 1,000 to 1,500 more calories, 50 grams more protein, and as much liver, wheat germ, and yeast as you can tolerate. Drink whole milk and increase your daily intake to 1½ quarts, preferably preparing pep-up or fortifying each quart with ½ cup of non-instant powdered skim milk (p. 101). A teaspoon of inositol daily might be added to pep-up. At least until your milk is well established, sip a small glass of pep-up each time as you nurse your baby.

Your menus and supplements can follow the suggestions given earlier (p. 107), except that your calcium intake should be increased to 3,000 milligrams daily. Magnesium, of course, must be taken proportionately (p. 92). Take 2 or 3 calcium-and-magnesium tablets after each meal and mid-meal and with a glass of whole milk or pep-up before bed.

As a nursing mother doing your own housework and perhaps caring for other children, your calorie requirement is comparable to that of a day laborer. Getting too few calories can decrease your milk supply and cause both your dietary protein and body protein to be wastefully used as calories. The fact that your requirement for calories is high, however, should not be used as an excuse for eating junk food. Let everything you eat build health. Have more whole-grain bread and butter with meals, if you like. Keep dishes of unsalted nuts within easy reach and munch them as you do your housework. Add cheese with an apple or banana to your mid-meals. Have yeast in juice or pep-up on a convenient table and take a sip each time you pass by.

The over-the-hump diet. Most mothers find that their milk supply decreases if they fail to get enough rest, are emotionally upset, or have too many visiting relatives. If you feel you do not have enough milk to keep your baby from being hungry, simply nurse him more often and allow him to drain both breasts each time. Above all else, resist giving a formula or introducing solids; either spells the beginning of the end of nursing.

If you have had enough milk to nurse your baby at all, the chances are that you can increase your supply within three days by eating foods known to stimulate milk production. This over-the-hump diet consists of eating the following quantities:

6 tablespoons of yeast, preferably heaping, taken 1 tablespoon with each meal, 1 between each meal, and 1 before bed; take in pep-up, milk, or juice; be sure the yeast is balanced with calcium and magnesium (p. 110)
¼ pound fresh liver, preferably at breakfast; and 1 tablespoon or more of desiccated liver or 15 liver tablets at each meal when fresh liver is not eaten; stir desiccated liver into water or tomato juice
1½ quarts of milk, which may be a combination of fresh whole milk, buttermilk, and yogurt; fortify fresh milk with ½ cup non-instant powdered milk per quart or make into pep-up containing 2 eggs (pp. 101-102); sip approximately 1 cup of this milk at each meal, between each meal, and before bed
1 teaspoon of inositol, taken in milk or pep-up (optional)
½ cup wheat germ, as a cooked or cold cereal

If you manage to eat these quantities, you will probably be too full to eat anything else; take your supplements but forget about other foods unless you want them. If you cannot eat these amounts, then do the best you can. I strongly suspect that this diet would make even a statue produce more milk than any baby could drink, provided the food is digested and absorbed and no emotional factors interfere.

Value of rest and sleep. Most mothers believe their milk dries up because they have worked too hard, become overtired, and perhaps lost sleep. When the diet is adequate, however, it is amazing how much physical work a mother can do without decreasing her milk supply. My young friend who sold breast milk is a case in point. She used to go out daily to clean homes, and for a time cleaned for me. She would arrive early in the morning with her baby and sterile bottles; except for the time she spent nursing him and expressing the remainder of her milk, she was scrubbing floors, washing windows, and doing every variety of difficult housework. She had plenty of milk for her own baby at all times and, as long as she took yeast, a surplus to sell.

Surely the pioneer women who had many children and nursed them all did as much work as most mothers do today. They were successful largely because no refined or processed foods were available. Because fruits and vegetables were usually scarce, they lived mostly on meats and breads and cereals of unrefined grains.

The harder a person works and/or the more sleep he loses, the higher are his requirements of the B vitamins. These vitamins are needed in proportion to the energy out-put. Since such large amounts of B vitamins are already essential for lactation, a slight deficiency quickly results in both fatigue and a decrease in breast milk.

Ample rest is, of course, absolutely essential. Stretch out in bed as you nurse your baby; let your housework go; make your cooking simple; keep yourself so relaxed that you feel like a sack of cotton; get rid of relatives who annoy you; and turn a deaf ear to all advice-givers who wreck your self-confidence. The more rest you obtain, the lower will be your need for B vitamins, the more milk you will have for the evening feeding, and the more quickly your baby will sleep soundly throughout the night.

Cracked nipples, sore breasts, and breast infections. If the slightest redness appears on either breast, call your physician immediately. Pediatricians on the advisory board of the La Leche League suggest that if your nipples are cracked or an inflammation, infection, or abscess occurs, your baby should be fed frequently so that his sucking will be gentle. These doctors point out that any blood the baby may get from a cracked nipple is quite harmless; and that a caked breast or inflammation, abscess, or infection, almost invariably associated with an incompletely drained milk duct, usually clears in two or three days if the duct is drained by nursing. When a baby is taken from the breast, however, the duct remains plugged, and a painful infection may persist for weeks. Regardless of the problem or the type of infection, however, the diet should be immediately improved.

The quickest means of recovery is to follow the anti-stress program (p. 110) round the clock for at least three days, starting the moment the first symptom is observed. Usually recovery is so prompt that nursing need not be interrupted.

Mineral oil, often sold as "fine baby oil," should never be put on cracked nipples (or on the baby). Such oil would be swallowed by the baby and can rob him of vitamins A, D, E, and K (p.49). Any vegetable oil may be used with absolute safety.

How long should nursing be continued? This question can be answered with one simple statement: as long as you and your baby both enjoy it. There is no set time. A week of nursing is better than none; two months is better still. The child who is nursed for nine or ten months is fortunate indeed. The ideal is to allow the baby to wean himself, which may be when he is a year old. Some children find comfort in nursing perhaps once daily until they are three years old. Others lose interest but wish to nurse again a few times when a new baby arrives. Studies have shown that self-weaned children become emotionally stable and mentally sound adults, able to withstand far greater physical and psychological stress than the average person can endure. I would say to nurse your baby as long as you want to; it is no one's business but your own.

One striking characteristic of self-weaned children is their early independence; they become amazingly self-sufficient. You do not see them, for example, making pests of themselves by trying to get attention from a group of adults, interrupting every conversation. Their emotional needs have been so fulfilled that they want more attention the way a college graduate wants an eighth-grade diploma. Their interests are elsewhere.

Let nursing be a time of joy. Awareness that your baby is tiny for such a short time can add to your enjoyment of nursing him. Each new period of growth is fascinating, but the cuddly helplessness of the small baby, the warmth and intimacy between yourself and your infant, and the many charms of babyhood can never be recaptured. Relax and enjoy him while you can. Buy yourself a comfortable rocking chair. No matter how off-key your voice, learn some lullabies. You will find that your fulfillment as a woman will leave you feeling rewarded for a lifetime.

CHAPTER EIGHTEEN

The Basis of a Good Formula

The health-building qualities of any formula depend largely on the type of milk used. Let us consider each variety, so that you may select the most nutritive one available to you.

Breast milk. If you cannot nurse your baby, consider purchasing breast milk for him, especially if he has been born prematurely or is unhealthy in any way. Even one bottle of breast milk daily will stimulate the growth of valuable intestinal bacteria and supply human antibodies (gamma globulins), thus tremendously increasing his resistance to infections. The more breast milk you give him and the longer you give it, the healthier he will probably be. Though seemingly expensive, breast milk usually proves to be economical because money is saved later on antibiotics, drugs, and often hospitalizations.

For the first two weeks after we obtained our tiny to-be-adopted son, I purchased breast milk for him. The rapid change from a puny, unhealthy infant to a vigorous, beautiful baby was gratifying indeed. The fact that he had no infections during his first years was in part because of this excellent milk.

Medically certified raw milk. From the standpoint of nutrition, raw certified milk is superior to any except breast milk. This milk, obtainable in some areas from both goats and cows, is produced by animal aristocracy. Since a certified herd is given the best food available, again and again such milk has been found to have a higher vitamin and mineral content than do other types of milk.

The late Dr. Francis M. Pottenger, Jr., showed that far superior health could be produced in animals and babies alike by giving certified raw milk instead of pasteurized or evaporated milk. Dr. Pottenger once told me he was convinced that children given raw milk were far more beautiful, certainly healthier, and much more intelligent than children given heat-treated milks. His x-rays of the bones of infants fed certified milk are so spectacular compared with those of babies given standard formulas that anyone seeing them would probably never forget them. Excellent skeletal structure was shown by strong white shadows indicating densely mineralized bones and by the width of the chest, the breadth of the dental arch, and the thickness of the bones themselves. Children with this type of bone become straight and handsome; their teeth are resistant to decay and are not crowded together; hence orthodontia is not necessary later. The bones of the infants given pasteurized or evaporated milk showed slight mineral deposits; their chests were narrow, their dental arches underdeveloped, and their bones themselves thin and fragile.

The officials in charge of the production of medically certified milk at our local dairy tell me that no DDT or other poison sprays are used in the barns where the certified herds are kept; that all food purchased for the animals is reported to be free from pesticides; that tuberculosis and Bang's disease have never occurred in their certified herd; that a closed circuit exists between the milking machines and the milk bottles; and that the pipes through which the milk passes are sterilized daily with superheated steam. All workers are given a physical examination each month by a physician; none suffering from an illness, regardless how mild, is allowed to work. The bacterial count of their certified milk averages less than 2,000 per milliliter, whereas the law in our state permits 5,000.

The principal objection to giving raw milk to babies has been danger of undulant fever, which has now been eliminated by inoculating calves. When persons are violently opposed to raw certified milk for an infant, I strongly suspect that they have not taken time to find out how truly superior it is or how carefully it is produced. Perhaps they have lost sight of the fact that in trying to protect health, certain health protectors may be destroyed.

If you live on a farm and know your cows or goats personally, are positive they are free from disease, and take every precaution in handling the milk, such raw milk is ideal for your infant and need not be boiled. Sometimes you can find a farmer in your neighborhood who is producing safe raw milk. Most of my generation were brought up on raw milk, and no one dreamed of being afraid of it. I first tasted pasteurized milk when I went to college.

In warming the bottles for the baby, take care that they do not heat above body temperature and thereby destroy the values gained in using raw milk.

Goats' milk. The advantages of goats' milk are that it is homogenized by nature, contains somewhat more milk sugar than does cows' milk, and rarely causes allergies. It is excellent milk, and the many young parents now keeping goats to supply milk for their children are wise indeed.

Formulas of yogurt or acidophilus milk. Formulas made of or containing yogurt or acidophilus offer so many advantages that they should be used far more frequently than they are. The enzymes produced by the bacteria in yogurt or acidophilus partially digest the protein during the culturing process; the valuable bacteria break milk sugar into lactic acid, which increases calcium absorption; and gas-forming and disease-producing bacteria cannot thrive in the lactic acid thus formed.

Compared with infants given other types of formulas, infants given yogurt or acidophilus have far less colic, diarrhea, constipation, intestinal infections, and even fewer infections of the middle ear, throat, and lungs (pneumonia). Stools of infants given such formulas are said to be "remarkably negative," or free from disease-producing bacteria. The bacteria supplied by yogurt or acidophilus hinder the development of almost every variety of disease-producing organism, including those which change nitrates into dangerous nitrites (p. 202) and others causing salmonella and dysentery.

Even when pathogenic bacteria have been experimentally added to yogurt, they have lost their ability to produce disease within 30 to 40 hours. Such formulas have been recommended for hospital nurseries simply because they save the hospitals the expense of buying antibiotics. These formulas need not be sterilized. In fact, they are especially recommended to retard bacterial growth wherever refrigeration is poor. A principal advantage of such formulas, however, is that yogurt bacteria produce B vitamins and vitamin K, which can then pass into the infant's blood. The real value of such bacteria becomes evident when they are destroyed by oral antibiotics; unless the bacteria are quickly replaced, multiple deficiencies of B vitamins and of vitamin K result, causing hemorrhages, anemia, and a wide variety of other symptoms. Conversely, yogurt or acidophilus should always be given with and after oral antibiotics to prevent such deficiencies (p. 98) and infestation with *Candida albicans.* Yogurt or acidophilus formulas are well tolerated by healthy and ill babies alike, but are especially recommended for infection-susceptible premature babies and for infants suffering from colic, enteritis, diarrhea, constipation, or allergies.

Commerical acidophilus milk or yogurt (unsweetened) may be used, but these are customarily prepared with skim milk. If either of them or yogurt prepared at home from powdered skim milk is used, ½ cup of thin cream, or half and half, should be added to each quart. Before pouring the yogurt into the nursing bottles, beat it thoroughly to break up the curds; nipples with somewhat larger holes may be needed.

Under no circumstances, however, should an infant be given commercial yogurt made of skim milk unless cream is added (p. 90).

Buttermilk formulas. A surprising number of formulas of cultured buttermilk and other forms of undefined "acidified" milk are recommended in the medical literature. Churned buttermilk contains too little calcium and protein to be given an infant. Cultured buttermilk, however, is made from skim milk with 2 per cent butterfat added, and is satisfactory provided ¼ cup of light table cream, or half and half, is combined with each quart. The lactic acid formed during the culturing process offers much the same advantages as a yogurt formula. The lactic-acid bacteria supplied by buttermilk, however, cannot live at body temperature; hence they do not produce B vitamins in the intestine. The bacteria in yogurt or acidophilus continue to thrive in the intestine weeks after they have been introduced.

Formulas of pasteurized milk. Satisfactory formulas can be prepared of pasteurized milk provided a yogurt tablet, acidophilus culture, or a few tablespoons of unsweetened commercial or homemade yogurt are stirred into a day's supply. During pasteurization, however, there is destruction of enzymes, hormones, vitamin C, and several of the B vitamins, especially folic acid and pantothenic acid. During pasteurization, calcium clogs the pipes through which the milk passes; hence the calcium left in the milk is decreased. When milk is heated, one of the essential amino acids, lysine, is partly destroyed, though damaged less in pasteurizing than in canning. Unfortunately, babies require three times more lysine than do adults, a fact which makes any heated milk inferior for formulas. Because yeast is rich in lysine, however, this shortcoming can be remedied provided yeast is added to the milk.

Pasteurized milk is usually safe for a healthy newborn infant without being sterilized. If refrigeration is poor, especially during hot weather, when bacteria grow with amazing speed, sterilization is essential, particularly for an ill or very young baby. The scum forming over boiled milk contains a valuable protein, lactalbumin, and nutritive value is lost when it is removed. If the entire formula of pasteurized milk is made up for a day and poured into bottles which are then put into boiling water or steam, bottles, nipples, and formula can all be sterilized at one time, and no protein need be lost. In this case, yogurt or acidophilus should be stirred into the formula with a sterile spoon after it has been cooked.

The pasteurized milk that has not been homogenized is preferable to homogenized. Homogenization, produced by forcing milk into a fine spray by compressed air, destroys a considerable amount of vitamin A.

Powdered whole milk. When fresh milk is not available, good formulas can be prepared with powdered milk, provided the butterfat has not been removed or ½ cup of light cream is added per quart. Formerly, heat treatment caused powdered milk to be low in lysine, but processors now claim that water is evaporated off largely under vacuum and little heat is used. Most dried milk has probably been pasteurized, however; hence yeast should be added as a lysine supplement.

Unless powdered milk is kept tightly covered, it can lump badly. Before being made into a formula, it should be reconstructed into liquid milk; proportions given on the package are usually ¾ cup of powdered milk to be combined with 3½ cups of water.

Formulas of evaporated milk. I would rank formulas of evaporated milk no higher than eighth best. Use it only when no better milk is available. All canned milk and canned baby formulas have been harmed by heat; enzymes, hormones, vitamin C, several B vitamins, lysine, and possibly unknown factors supplied in safe raw milk have been damaged or destroyed.

Canned baby formulas and those prepared with evaporated milk are frequently recommended, not because they produce healthy children but only because they are easy for the mother to use. Evaporated milk has some advantages, however, in that it is uniform, sterile, readily available, easily stored, and contains vitamin D. It should never be used alone as a formula if the goal is to build health.

Soy milk. Commercial soy-milk formulas are deficient in so many nutrients that in my opinion they are extremely dangerous. Since they contain no milk sugar, or lactose, they cannot support the growth of valuable intestinal bacteria which synthesize B vitamins or form lactic acid, as essential to the absorption of calcium as is vitamin D. Soy milk is low in the two essential amino acids, methionine and cystine; it is inadequate in calcium, so lacking in iodine that goiter has developed in children raised on it, and so deficient in vitamin B_1 that deaths have been reported in infants given soy-milk formulas.

In studies where unfortunate infants have been given prepared soy-milk formulas and compared to others receiving skim milk, the babies given soy milk have fared far worse. All infants in both groups had diarrhea, skin rashes, low resistance to infections, and deformed bones. The soy-milk formulas, however, were considered to be only half as good as the skim-milk ones; and babies receiving them had fewer antibodies, lower blood protein, lower blood calcium, more colic, more severe diarrhea, and sorer bottoms.

If it is absolutely necessary to use a soy-milk formula, every effort must be made to overcome its many nutritional deficiencies. A better product can be made and money saved by preparing soy milk at home. Blend in a quart of water 1 cup of full-fat soy flour or powder to which calcium and magnesium have been added (p. 93); then cook in the top of a double boiler for 20 minutes to prevent gas. Long heating is necessary to destroy a number of toxic substances which occur in soybeans. Because yeast supplies the B vitamins, many minerals, and the amino acids soy flour lacks, it should be added to the formula.

Commercial formulas and filled milks. While laws concerning the production of our dairy products are strict indeed, a variety of filled and imitation milks are now sold without the control of any federal or state authority. They are not standardized. Some have bacterial counts much higher than are allowed in genuine milk.

Most commercial baby formulas are now made of filled milk prepared by adding cheap vegetable fat to fresh or powdered skim milk. Physicians recommending such formulas apparently believe that they help to prevent blood vessels from being clogged with cholesterol, a problem which does not exist when the diet is adequate. Nevertheless, the argument is that filled milk contains no cholesterol; and that vegetable oils help reduce heart disease.

The hook in this worm is that the vegetable fat used in filled milk is largely coconut butter, which is highly saturated and, when fed to experimental animals, *increases* blood cholesterol. Coconut butter is cheap, has no objectionable flavor, does not become rancid, and rarely has to be mentioned on the label. To maintain normal blood cholesterol, however, one must have a large proportion of essential fatty acids (polyunsaturated) to saturated fatty acids. Unsaturated fats are oils, liquid at room temperature, whereas saturated fats are solids. Butterfat, which is a mixture of the two, contains 62 per cent saturated fatty acids and 37 per cent unsaturated (1 per cent water). In contrast, cream substitutes, ballyhooed as being health-building because made of "vegetable oils," were found to contain 95 per cent saturated fat and less than 5 per cent unsaturated, compared to the 37 per cent in butterfat. Whole-milk formulas are far superior for babies than any made of filled milk.

Imitation milk. Compared to whole milk, imitation milks are low in protein, vitamins, and minerals; the calories come largely from corn syrup, which is used instead of lactose; and rather than being made of milk protein, they often contain sodium caseinate, "of questionable nutritive value." The producers claim that some imitation milks are non-allergic in that they are made only with water, soy flour, corn syrup, coconut fat, and a little corn oil, and contain no dairy products. Usually omitted from the label are a variety of emulsifiers, stabilizers, artificial flavorings, colorings, and such additives as sodium silicoaluminate.

The Council on Foods and Nutrition of the American Medical Association has advised physicians that the use of filled and imitation milks in the diets of infants and children is *"undesirable and should be discouraged."* Yet the popularity of these products, costing some 5 cents less per quart than wonderful milk, has already put thousands of dairymen out of business. All I can say is, "God help our poor American children."

The tragedy of skim-milk formulas. Though thousands of pediatricians now recommend skim-milk formulas, researchers have repeatedly pointed out that they are extremely dangerous. Fifty years ago and many times since, it has been shown that calcium from milk cannot be absorbed without the cream. Fat is equally necessary for the absorption of vitamins A, D, E, and K. Even milk sugar is not utilized normally when skim milk is given; much of the galactose formed from it is lost in the urine. Cataracts have been produced in rats by feeding skim milk, yet it was impossible to produce them when whole milk was given; and when galactose has been excessive in the blood, cataracts have developed even in children. Furthermore, without fat, no linoleic acid is available, though it is needed by every cell in the body including brain cells; this lack allows kidneys to be damaged, blood cholesterol to be abnormally increased, eczema to be produced, and growth to be stunted. When young rats are kept on fat-free diets, their brains do not develop.

Because of skim-milk formulas, convulsions are becoming more common among newborn infants. Babies get far more infections, which increase markedly even when only half of the cream is removed. Infants given skim-milk formulas have extremely low blood vitamin E, and vitamin-E-deficiency anemia occurs even though the vitamin is given. A rapid increase in rickets, reported both in the United States and Canada, is thought to be largely caused by skim-milk formulas.

Other damage is undoubtedly being done which has not been investigated. For example, the RNA (p. 37) production in an animal's brain decreases within half an hour if perfused with fluid low in calcium; every variety of experimental animal, including insects, has serious kidney damage if kept on a fat-free diet; and without linoleic acid, blood cholesterol soars and abnormal amounts are laid down in the walls of the arteries, a condition now found to be common in American babies.

The fact that babies given skim milk—denied linoleic acid—develop severe eczema has been established for years. Physicians from the Department of Pediatrics at the University of Texas, in a study involving 454 babies, compared formulas of canned skim milk with others of canned whole milk, filled milk (p. 165), or skim milk plus coconut butter. The babies on the skim-milk formula quickly developed diarrhea; and by the time they were three months old, all had red, sore, oozing eczema in the folds of the knees, elbows, and buttocks and severe irritation around the anus, a problem not found in infants receiving butterfat or vegetable oil. One baby at three weeks developed eczema which became progressively worse until he was given linoleic acid; though his skin quickly healed, the linoleic acid was then withdrawn and the severe eczema allowed to recur. Growth was unsatisfactory in all babies receiving the skim-milk formula, though some were kept on it until they were nine months old. All groups suffered many infections, but the most seriously ill ones were those kept on skim-milk formulas; 26 had to be hospitalized and seven died, one of bronchial pneumonia and diarrhea when only 41 days old. The skim-milk formula was eventually considered too dangerous to continue. Of the various formulas given, the whole cows'-milk formula produced the healthiest infants.

All of the formulas were so sugar-loaded with corn syrup that the stools of infants having diarrhea were described as syrupy. All were heat-treated, hence low in lysine (p. 148). These babies were given supplements of vitamins A, C, D, a little vitamin B_1, B_2, niacin, and a tiny fraction of the amount of vitamin B_6 most babies need. Apparently all lacked pantothenic acid, folic acid, biotin, cholin, inositol, vitamin B_{12}, magnesium, zinc, iodine, and trace minerals.

The trusting mothers were enticed to cooperate in this experiment by being given free formulas and free medical service, including night emergency calls. All costs were paid by a company well known for selling baby foods, which indicates to me that they have little love for children.

When I first read this report, I felt so profoundly shocked that I simply could not believe what I was reading. If you doubt my reporting of it, as some readers surely must, I urge you to go to any medical library and read for yourself this article, published in the Supplement to the medical journal *Pediatrics*, vol. 31 (1963), p. 171. This study is by no means the only one in which babies have been deprived of essential nutrients. Where is the line to be drawn between research and cruelty? We recognize that scientists produce disease in animals by inadequate diets. Is it not time to recognize that some pediatricians, insufficiently trained in nutrition, are producing disease in infants by similarly inadequate diets?

No one can know the amount of damage which is being done not only to these children's brains, blood vessels, and kidneys, but also to the thousands of infants now being kept on skim-milk formulas. Undoubtedly each will carry throughout life the scars of being given such inadequate diets.

Commercially prepared formulas. The majority of pediatricians now recommend commercially canned formulas. It takes little time to explain to mothers how they are to be prepared; certainly they are easy for women to use; and representatives from companies marketing these formulas, themselves untrained in nutrition, usually claim that they are equally as good as breast milk.

Most such formulas are now made of cheap filled milk (p. 165) not unlike some used in the experiment just cited. Many contain far too much sugar; others have a dangerous phosphorus overload (p. 173); all have been harmed by heat; and they are invariably lacking in so many nutrients that I consider it a disgrace that companies produce them, pediatricians recommend them, and parents buy them. I am convinced that the genetic potential is never reached by any child fed them.

The tragedy of American babies. It is tragic indeed that in America individuals untrained in nutrition, even though they are well-meaning and highly educated, are looked up to as authorities in infant feeding. Fortunately, mothers aware of nutrition can protect the health of their own children, provided they have the courage to do so.

CHAPTER NINETEEN

Making a Formula Adequate

Little can be said for the nutritional value of formulas customarily given to American babies. One physician has written that each newborn is obliged to adjust to "a damaging formula" which apparently causes 10 per cent of these babies to be mentally retarded (even though their brains were normal at birth) and 60 per cent to develop allergies.

Because cows' milk supplies about the same amount of fat but less sugar and more protein, calcium, and phosphorous than does breast milk, formulas have generally been prepared by diluting cows' milk and adding sugar. The composition is then somewhat the same as that of breast milk. The nutritive value is far from it.

Diluting the formula. For a newborn infant, boiled water should be added to cows' or goats' milk to be used in the formula, principally to reduce the phosphorus content (p. 173). After three weeks, if the baby is tolerating the formula well, the amount of water should gradually be decreased. For a healthy infant six weeks old, milk need no longer be diluted. I gave both of my children only undiluted cows' milk, which research had shown to produce excellent development. Because newborns often do not efficiently digest large amounts of protein, however, there is more danger of allergies when milk is undiluted at first.

A main objection to diluting cow's milk is that the fat content is reduced below half that of breast milk. Butterfat is an excellent source of vitamin A; and the less fat supplied, the less readily calcium is absorbed. Diluting the milk, therefore, decreases both the calcium absorption and retention and the vitamin-A intake, causing babies to have more infections than if they were receiving undiluted whole milk. Moreover, without the cream, infants' appetites are less readily satisfied; hence they take larger quantities of the sugar-loaded formulas, often becoming disgustingly fat and subject to more chafing, eczema, and skin infections than infants allowed the full amount of butterfat in undiluted milk. This situation can be rectified by adding ¼ cup of light cream to each quart of diluted milk to be made into a formula.

The advantages of milk sugar. The only sugar found in any type of milk is lactose, which offers your baby far more advantages than do other sugars. Though milk sugar is absorbed and used as calories, much of it becomes food for the valuable intestinal bacteria which produce B vitamins. These bacteria convert milk sugar into lactic acid, which helps to keep minerals in solution; thus milk sugar markedly increases the absorption of calcium, iron, phosphorus, magnesium, and other minerals from all parts of the small intestine. The more acid in the intestinal tract, the greater is the quantity of these minerals absorbed. Furthermore, disease-producing bacteria cannot live in lactic acid (p. 162). Because much milk sugar does not reach the blood, babies given formulas to which it is added do not become sloppy fat.

Tremendous harm has been done by using formulas high in a variety of sugars such as corn syrup, maltose, or malt sugar, and ordinary table sugar. None of these sugars can support the growth of desirable bacteria, aid in the synthesis of B vitamins, or increase mineral absorption. In fact, by stimulating the flow of alkaline digestive juices in the small intestine, they markedly reduce the amount of calcium and other minerals reaching the blood.

Compared to lactose, these sugars are extremely sweet; they force the baby to gain useless fat and to develop a taste for sweets which later shows itself in rampant tooth decay. Many pediatricians have been so overzealous in wanting babies to gain rapidly that they seem to ignore the fact that sugar-fed babies are soft, pale, flabby, irritable, lack muscle tone, and often suffer from colic, diarrhea, and infections. On her doctor's advice, a young acquaintance is feeding her tiny premature daughter daily corn syrup in water. I can think of no better way to reduce the protein intake and thus damage her infant's brain.

For a time I recommended unrefined black molasses as a source of minerals and heat-stable B vitamins, as well as sugar for infants' formulas. Studies have now shown, however, that babies are far healthier and absorb larger

Composition of 1 liter or slightly more than 1 quart of milk

	Breast Milk[a]	*Cows' Milk*[a]	*Goats' Milk*[c]	*Soymilk Formula**	*Formula** #1[g, h]	*Formula** #2[g, h]
Protein, gr.	12	23	32	34	15	18
Fat, gr.	38	25	40	40[d]	37[i]	36[i]
Linoleic acid, mg.	3,200	400	—	—	—	—
Milk sugar, gr.	70	33	72	60[e]	70[j]	70[j]
Water, gr.	852	874	875	924	875	872
Calcium, mg.	330	860	1,290	525	650	700
Phosphorus, mg.	140	930	1,060	350	500	500
Magnesium, mg.	40	130[b]	170[b]	—	—	—
Iron, mg.	1.5	0.7	1	7.5[f]	8.5[f]	12[f]
Sodium, mg.	160	500	340	350	550[k]	550[k]
Potassium, mg.	510	1,440	1,800	8,300	1,750[k]	1,750[k]
Iodine, mcg.	—	—	—	50	65	—
Vitamin A, U.	2,400	1,400	1,600	2,500	1,500	2,500
Vitamin E, U.	5.6	0.4	—	5	5	5
Vitamin B_1, mcg.	160	288	400	1,000	400	650
Vitamin B_2, mcg.	426	1,077	1,100	1,500	1,000	1,000
Vitamin B_6, mcg.	110	329	—	1,000	300	—
Folic acid, mcg.	1.8	1.1	—	—	—	—
Niacin amide, mcg.	1,720	583	3,000	7,500	4,000	—
Vitamin C, mg.	43	11	10	50	50	50
Vitamin D, U.	—	—	—	400	400	400
Calories	710	675	670	640	640	670

* Commercial formulas

a. Figures for human and cows' milk taken from Aitken, F. C., et al., Nut. Abst. Rev. 30, 341, 1960

b. Varies with amount obtained from food

c. From U.S. Department of Agriculture, Handbook No. 8, 1963

d. Extra soy oil added

e. Corn syrup, malt sugar, and table sugar (cane sugar) added

f. Ferrous sulfate added

g. Made of skim milk, with corn and coconut fats added

h. Contains the following additives: mono- and diglycerides, carrageenan, polysorbate 80, and potassium citrate

i. Corn oil and coconut butter added

j. Lactose added

k. Calculated from quantity in milk

— No data available

gr. = grams; mg. = milligrams; mcg. = micrograms; U. = units amounts of calcium when allowed no sugar whatsoever except lactose.

A quart of breast milk supplies approximately twice as much lactose as cows' milk. To bring the milk-sugar content of a formula to that of breast milk, 5 level tablespoons of lactose (9 grams per tablespoon) would have to be added for each quart of milk. This sugar, which may be purchased at any drugstore, is quite laxative; therefore the amount put into a formula for a tiny infant should be increased gradually. By the time a baby is two or three months old and the milk is no longer diluted, milk sugar can be discontinued. Milk sugar increases the need for vitamin B_2; hence yeast should be used in any formula containing it.

Adding yogurt or acidophilus culture. The desirable bacteria which so readily live in the intestines of a breast-fed infant are not available to formula-fed babies unless yogurt or acidophilus is added to the formula (p. 162). Both yogurt tablets and liquid acidophilus culture are available in which the bacteria are highly concentrated; either of these or homemade or commercial yogurt or acidophilus may be used, but some reliable source of these bacteria should be added to the first formulas. Vitamin K, synthesized by such bacteria, is needed immediately after birth to prevent serious hemorrhaging (p. 100).

Excess phosphorus is dangerous. Breast milk contains 2.4 times more calcium than phosphorus, a proportion which is ideal for a baby's development. In contrast, cows' milk supplies approximately seven times more phosphorus than does breast milk, a condition physicians speak of as a "phosphorus overload," causing the phosphorus in the blood to be excessive (hyperphosphatemia) and the absorption of both calcium and magnesium to be markedly reduced. A lack of either calcium or magnesium, produced by such excessive phosphorus, can result in convulsions in healthy full-term infants as early as the sixth day of life. Such convulsions are now becoming increasingly common because persons untrained in nutrition are adding insult to injury by giving tiny babies skim-milk formulas in which the lack of fat prevents calcium from being absorbed. In case a formula of cows' milk is not diluted, the baby gets even more of a phosphorus overload, and the convulsions become more frequent and severe.

Physicians studying this problem point out that pediatricians are too often unaware of the danger of calcium-phosphorus imbalance; that after such convulsions usually nothing is done except that anticonvulsive drugs are given and often continued for years; and that since the formula is not improved, the baby is forced to suffer repeatedly from recurring convulsions.

Adding calcium to the formula. By adding to the formula enough calcium to make twice as much calcium as phosphorus, thereby more nearly approximating the proportion in breast milk, the problem of phosphorus excess is solved. This proportion, now recommended by the National Academy of Sciences—National Research Council for all newborn infants, can be achieved by adding to each quart of formula 1¼ teaspoons calcium carbonate, 1 tablespoon calcium lactate, 2 tablespoons calcium gluconate, or ½ of the shell of a boiled egg (therefore sterilized) thoroughly blended in a liquefier with a little milk. Each of these sources supplies approximately 600 milligrams of calcium. An egg shell is most economical and has no flavor. Calcium gluconate dissolves easily and is only mildly chalky. Bone meal could be used, but it is high in phosphorus. I can find no research indicating the safety of dolomite as a source of calcium for humans.

There need be no fear of giving a baby calcium provided the foregoing amounts are not greatly exceeded. An excess is harmlessly excreted in the feces, though too much calcium can cause a loss of phosphorus and magnesium. Abnormal calcium deposits in soft tissues result not from excessive intake but from deficiencies of magnesium or vitamin E.

Supplying magnesium. Though cows' milk contains magnesium, the excessive proportion of phosphorus prevents it from reaching the blood. Calcium can be neither absorbed nor utilized without magnesium; and the larger the calcium intake, the more magnesium needed. If magnesium is not supplied, calcium is wastefully excreted. By the third day of life, babies given cows'-milk formulas show abnormally low blood magnesium, which causes them to cry excessively, be wakeful, sensitive to noise, and suffer muscle spasms and tremors. Low-magnesium tetany, or convulsions, frequently occurs, which, without a blood analysis, cannot be distinguished from the convulsions caused by low blood calcium or a lack of vitamin B_6 (p. 281). All magnesium-deficiency symptoms have been promptly corrected when less than ½ teaspoon of ordinary Epsom salts (magnesium sulfate) has been added to a formula.

Different researchers have suggested 40, 150, 300, or 500 milligrams of magnesium daily for bottle-fed babies.

The magnesium intake should be roughly half that of calcium, provided this amount does not cause diarrhea.

Natural magnesium oxide separated from ocean water is most often recommended, though Epsom salts may be used. Magnesium oxide is tasteless when first added to milk, but develops an unpleasant flavor on standing; put it into one bottle of formula immediately before it is drunk. Because magnesium is extremely laxative, I suggest adding only ⅛ teaspoon or less—125 milligrams—at first, and if the stools remain formed increase it gradually to ¼ teaspoon daily, or 250 milligrams. Decrease the amount should diarrhea occur, but continue at least a pinch daily, gradually increasing it again later; a severe magnesium deficiency can be caused by diarrhea.

The advantages of giving yeast. Bottle-fed babies are far healthier if given yeast as a source of B vitamins, iron, copper, trace minerals nucleic acid, and extra protein. Such babies rarely if ever become anemic, suffer from diarrhea, constipation, or infant eczemas resulting from B-vitamin deficiencies, or develop allergies and/or susceptibility to infection. Furthermore, I have never known a baby to be upset by yeast, provided it was introduced in small amounts and increased gradually; every bottle given to my babies contained yeast. Such yeast-fed babies are happy and content, sleep soundly, cry little, gain readily, and are so full of health and smiles that they are a joy to care for.

Yeast is sterile and needs no refrigeration. Torula yeast is preferable to other types because it contains only a fraction—6 compared to 165 milligrams per cent—as much sodium (p. 212). Unfortunately, all yeast is extremely rich in phosphorus and *must not be used* unless calcium and magnesium have been added to balance its phosphorus content. Such balanced yeast is now commercially available. If other yeast is used, 1 tablespoon of magnesium oxide or Epsom salts and ¼ cup of calcium lactate or ½ cup of calcium gluconate should be sifted into each pound. Under no circumstances should bakers' yeast be given to an infant or an adult.

Advantages of giving vitamin C. The vitamin C in the blood of bottle-fed infants usually falls to an undesirably low level within three or four days unless this vitamin is immediately added to the formula. If it is not supplied, the growth of the cartilagelike base of bones and teeth ceases within hours; iron is not absorbed; the essential amino acids cannot be converted into body tissue; and susceptibility to allergies and infections is tremendously increased.

Since large amounts of this nutrient are not toxic, one should err in giving a bottle-fed baby too much vitamin C rather than too little.

Liquid and powdered vitamin C are available for infant formulas, but it is usually cheaper to make your own vitamin-C solution by liquefying 100 tablets of the vitamin, 500 milligrams each, with 1 cup of water; the resulting solution will supply 500 milligrams per ½ teaspoon. About ⅛ or ¼ teaspoon might be added to each bottle of formula. If you have no blender, 100 tablets (500 milligrams each) can be wrapped in paper, crushed with a hammer, and dissolved in 1 cup of boiling water. This solution loses little or none of its potency if kept refrigerated.

I can find no research proving that natural vitamin C builds greater health in babies than the identical inexpensive ascorbic acid. It is wise, however, to give bottle-fed infants 2 or 3 ounces of fresh orange juice daily as a source of bioflavonoids. Frozen orange juice contains too many additives to be recommended.

Your baby must have iron. During the last weeks of pregnancy, a full-term infant stores enough iron to last six months provided the mother's diet is excellent. If she is anemic, her baby will probably be also. A premature infant stores no such supply, but if he is nursed, he rarely develops anemia, even though breast milk furnishes only about 1 milligram of iron per quart (p. 172); millions of bottle-fed infants suffer from anemia in spite of receiving far more iron. Aside from anemia, a lack of iron causes a sore mouth and tongue, inactivation of numerous enzymes, inflammation of the intestines, faulty absorption of fats and fat-soluble vitamins, liver damage, and stunted growth.

Regardless of the amount of iron supplied, if the diet is deficient in the B vitamins, the stomach cannot secrete hydrochloric acid necessary to absorb this iron, and anemia results. Adding vitamin C to a formula can double iron absorption. Furthermore, anemia in babies, as in adults, is produced by a lack of protein, zinc, vitamins B_6 and E, and folic acid.

If yeast is added to a formula and gradually increased to 1 or 2 teaspoons per bottle, it can supply ample iron. My favorite pediatrician, now retired, used to ask his mothers to add 1 or 2 raw egg yolks to the day's formula, starting when the baby was three months old. A mother fearful of allergies of salmonella could first hard-boil the eggs, then liquefy them into the milk. Yeast and egg yolks together would supply more than the 5 milligrams of iron daily recommended as adequate by the American Medical Association.

Iron salts, though frequently recommended by pediatricians, destroy vitamin E (p. 126) and can cause both anemia and hemosiderosis, a fatal iron-storage disease. Starting solids early as a means of supplying iron and thus preventing anemia has failed miserably. In one study alone, 4,146 babies, aged six months, were anemic in spite of being stuffed with canned baby foods since shortly after birth. Infants given iron-fortified cereals containing 70 to 90 milligrams of toxic iron salts per ¾ cup (100 grams) showed no improvement over babies receiving breast milk or an adequate formula.

Iodine must not be overlooked. Though iodine is essential for health and a lack is associated with faulty brain development, abnormalities of the thyroid, deaf mutism, and damage from radioactive fallout, it is rarely included in a baby's formula. When solids are introduced late and the use of salt discouraged (p. 212), severe iodine deficiencies may occur.

A baby appears to need only 1 or 2 milligrams daily, which can be supplied by adding a pinch of dried kelp—less than ⅕ teaspoon—to a day's formula. Kelp, which is never toxic and is sold as a seasoning at health-food stores, also supplies other valuable minerals. This iodine supplement is particularly important for babies living near the Great Lakes or the Pacific Northwest.

Supplying trace minerals. A variety of minerals, needed daily, are rarely considered in planning formulas: zinc, essential for growth and brain development; copper, which, as part of RNA, is necessary for the production of all cells; and manganese, vital for muscle contraction. An infant's requirements of these nutrients are not known, but appear to be from 5 to 15 milligrams daily.

Should you wish to supplement your baby's formula with these nutrients, mixed trace minerals in powder form are available at most health-food stores. If they include iron, add ¼ teaspoon daily to a single bottle, to be drunk at least eight hours after vitamin E is given (p. 107). When iron is omitted, mix the minerals with the entire day's formula.

The Navy found that recruits who had no tooth cavities came not from areas having fluoridated water but from rural communities where people had their own wells and raised their own vegetables. Further investigation showed that their food and water were particularly rich in the six trace minerals: boron, molybdenum, lithium, titanium, vanadium, and strontium (not to be confused with the radioactive strontium from fallout). In contrast, decay was rampant in communities lacking these minerals. If a supplement furnishing a few micrograms each of these minerals becomes available, it would probably be wise to use it.

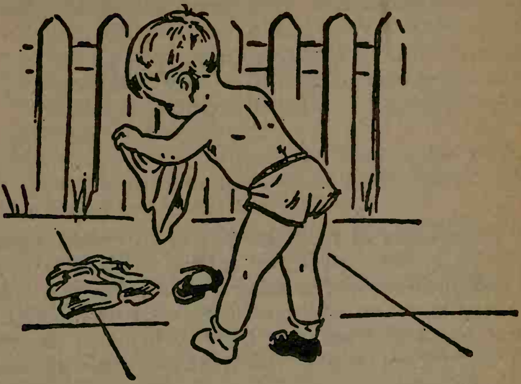
Should oil be added? Many pediatricians appear to believe that some vegetable oil should be included in an infant's formula to supply linoleic acid. If your baby is allowed whole milk, the linoleic acid furnished by butterfat is usually adequate.

When oil is added, a small amount of lecithin (p. 55) is needed to keep the oil homogenized. Both the oil and lecithin should be refrigerated at all times; and oil increases the need for vitamin E (p. 208).

What if my pediatrician disagrees? Most women take their babies to the "best doctor in town," who is invariably the most overworked one, with the least time to read. There is slight chance that he has studied the dozens of research projects summarized in these chapters, though most have been conducted by pediatricians who are also professors in leading medical schools. To protect your baby's health, a doctor must be skeptical of any new approach until he has had time to investigate it. Naturally, he will disagree with any formula differing from the one he recommends.

I know pediatricians who have given their own babies the types of formulas discussed here. When I have asked them why they do not use these same formulas for their tiny patients, they have told me it is because their colleagues would label them as crackpots and faddists. One pediatrician who is raising her babies on formulas to which yeast, calcium, magnesium, and other nutrients have been added has given up her practice to lecture on nutrition. She told me, "I simply can't give inadequate formulas any longer. I can't even recommend drugs. Well-fed babies are so beautiful!"

Because I have worked in well-baby clinics and enjoy them, I took both of my children to such clinics each month. There one quickly becomes acquainted with several fine pediatricians from whom to select a personal physician should an emergency arise; your baby is not exposed to sick infants, as he often is in a pediatrician's office; and since such clinics are paid for by us taxpayers, they are economical for young parents. No doctor there tried to force his ideas of baby feeding on me, and I volunteered no information, though I welcomed his expert opinion that my children were medically sound.



CHAPTER TWENTY

Formulas Are Easy To Prepare

The preparation of formulas has often caused mothers to lose faith in themselves, yet mixing a formula is usually less complicated than making a cake. The first rule is to introduce any new addition in such a tiny amount that it cannot possibly upset your baby. When you see that this food or nutrient is well tolerated, you can gradually increase the quantity.

If you feel frightened, you need not add all of the ingredients suggested for an adequate formula at one time. For eons, billions of babies have been fed nothing except breast milk, which is almost 10 per cent lactose; surely adding the milk sugar cannot frighten you. Since the phosphorus overload often causes newborn infants to have convulsions the first week of life (p. 173), you should be afraid not to introduce calcium and a tiny bit of magnesium early. The sooner yogurt or acidophilus is given, the less chance there is of hemorrhage or colic. If your courage is at low ebb, wait a few days if you wish before starting yeast and vitamin C. Always proceed slowly, not because the larger quantities suggested would upset your baby, but because he needs a calm, relaxed mother, free from worry.

Preparing the formula. It is usually easier to prepare a quart of formula at one time. While your baby is tiny, however, you may wish to make only half the suggested "recipe." Combine the following as your confidence permits:

1 quart of medically certified raw milk; yogurt made of whole milk; acidophilus milk; cultured buttermilk mixed with ¼ cup light cream; pasteurized whole milk; reconstructed whole powdered milk; 1 large

can of whole evaporated milk diluted with an equal volume of boiled water; or 1 quart of home-prepared soy milk (p. 165)

⅔ cup, or 6 ounces, cooled, boiled water

3 level tablespoons milk sugar, or lactose; increase gradually to 5 tablespoons

½ shell of boiled (sterilized) egg, thoroughly blended with a little milk, or 2 teaspoons calcium gluconate or lactate or ½ teaspoon calcium carbonate; gradually increase to 2 tablespoons calcium gluconate, 1 tablespoon calcium lactate, or 1¼ teaspoons calcium carbonate

1/16 teaspoon, or a pinch, magnesium oxide or Epsom salts (magnesium sulfate); if stools remain formed, gradually increase to ¼ teaspoon

¼ teaspoon of vitamin-C solution (p. 175); increase to ½ teaspoon or more daily

¼ to 1 teaspoon yeast; gradually increase to 1 or 2 teaspoons per bottle

pinch granular kelp; increase to ¼ teaspoon

¼ teaspoon trace minerals if free from iron (optional)

½ teaspoon of cold-pressed safflower, soy, corn, peanut, or combined vegetable oils (optional)

¼ to 1 teaspoon lecithin (add if oil is used)

In case the formula is not made of yogurt or acidophilus, add:

1 yogurt tablet, ½ teaspoon of acidophilus culture, or 1 to 4 tablespoons unsweetened yogurt or acidophilus milk

Combine all ingredients in a pitcher or blender. Stir well and fill bottles immediately, or keep in refrigerator until needed.

When your baby often seems hungry and you find no undigested curds of milk in his stools, gradually decrease the boiled water. Milk, already 88 per cent water, need not be diluted after the first or second month. The amount of milk sugar may be decreased as the water is withdrawn; it is usually discontinued by the third or fourth month. Milk sugar and yogurt or acidophilus together give the stools a soft puddinglike texture.

There is no more reason for your baby to have the same food day after day than there is for you to eat identical meals repeatedly. Perhaps most of the time you can give him a safe raw milk; on other days his formula may be entirely of yogurt, but at times it may be more convenient to use evaporated milk or buttermilk. His vitamin-C solution you will certainly wish to vary, increasing it perhaps to ½ teaspoon or more per bottle when he is inoculated or shows symptoms of an infection or allergy. If you use trace minerals containing iron, add them to an evening bottle and give your baby vitamin E in the morning. No more than 1 teaspoon of lecithin should be added unless the phosphorus is balanced with calcium and magnesium (p. 93); and oil must not be given unless your baby is allowed vitamin E daily (p. 203).

To sterilize or not to sterilize. Your baby can build up antibodies to fight illnesses only after small amounts of bacteria have gained access to his body. For this reason, the trend now is not to sterilize bottles, nipples, and food. The formula is simply put into clean bottles and capped with clean nipples. Your physician, however, will probably advise you to sterilize food for a premature infant, an ill one, and possibly for any baby during extremely hot weather. Sterilizing bottles is essentially the same as steaming or boiling potatoes. You merely put the potatoes (bottles, nipples, spoons, tongs, etc.) in water or steam, and let them cook for a given time before taking them out. You usually avoid handling hot potatoes; thus they remain sterile. Sterilizing bottles is as simple as that.

If your pediatrician wishes you to sterilize food and equipment, be sure to ask him when to stop sterilizing; the time varies depending on how healthy a baby is. There are arguments against too much sterilizing. For example, a study was made of the number of hemorrhages occurring in infants six to ten days old. Babies in a New York City hospital, kept under the most sterile conditions possible, suffered many times more hemorrhages than did a similar number allowed to be taken home. Vitamin K, produced by bacteria in the intestines, had prevented hemorrhages in the infants at home, whereas the overprotected babies obtained so few bacteria that they remained deficient in vitamin K. Inoculations and vaccinations are nothing more than injections of dead or half-dead bacteria, designed to stimulate the production of antibodies capable of destroying those specific bacteria later. A baby allowed a few germs gradually inoculates himself.

I recently had lunch with a pediatrician who is the father of four beautiful little girls. He was laughing over his change of attitude toward bacteria. "With our first baby," he said, "we sterilized everything in sight and didn't allow anyone to come near her. With each child we sterilized less and less. Now we sterilize nothing and show our baby to everyone who will look at her, except, of course, someone with a virulent infection. We figure the sooner she builds up antibodies, the better."

The realization that bacteria, introduced a few at a time, can be valuable may help some girls relax and enjoy their motherhood more than many women used to in the past.

Mechanics of preparing a formula. There are many ways of making a formula. If you have a liquefier, wish to prepare a day's formula at one time, and are not sterilizing your equipment, merely put some milk into the blender and, after starting the motor, add the milk sugar, calcium, yeast, and other ingredients, then pour in the remainder of the quart of milk. Yogurt, acidophilus milk, or buttermilk, if used as a formula, should first be blended to insure easy passage of the milk curds through nipple holes.

Should you prefer, merely line up clean widemouthed bottles, pour in the amount of milk the baby is accustomed to taking at each feeding, add a little boiled water and the other ingredients divided evenly among the bottles. Stir thoroughly or cap the bottles and shake them well before storing them in the refrigerator. Yeast, which may lump at first, will soon settle to the bottom.

If the milk must be sterilized, it can be boiled three minutes, cooled, and passed through a small sterilized strainer directly into a sterile container or bottles. Since yeast, milk sugar, calcium, and kelp are sterile, they may be stirred into the milk with a sterilized spoon. You may prefer to pour the milk into the bottles and sterilize milk, bottles, and nipples at the same time. Though milk sugar, magnesium, calcium, and kelp may be added before sterilizing, yeast, vitamin C, and yogurt or acidophilus should not be heated beyond body temperature. These foods can be stirred into the sterilized formula after it has cooled.

A formula of evaporated milk can also be made directly in the bottles. Wash the can and rinse thoroughly before opening it. Line up the bottles and pour into each enough boiling water to equal half the amount of formula the baby usually takes at a feeding, then add the milk and other ingredients.

Formulas for premature infants. I frequently find that woefully inadequate formulas of prepared milks are being given to premature infants, the very babies who need the best formula possible. Often mothers of such infants are young and unhealthy themselves and have no knowledge of nutrition; their pediatricians are so eager for these tiny babies to gain that they may recommend a sugar-loaded formula, losing sight of the fact that the smaller the baby, the greater is his need for protein and all other essential nutrients. Thus health is sacrificed and brains are damaged in favor of useless fat. Furthermore, the premature baby is less able to cope with the colic, diarrhea, and other disturbances which so often result from inadequate formulas, and his mother is likewise in no condition to cope with a shrieking, colicky baby.

Because such tiny infants may lack digestive enzymes, however, the formula should at first be diluted until the milk is seen to be well tolerated, then the water quickly decreased.

Formulas for premature infants need be no different from those given to full-term babies. Since babies born prematurely are usually unhealthy and are particularly susceptible to anemia, rickets, colic, and other abnormalities, however, the formula should be made completely adequate as soon as possible, and all supplements, especially vitamin E (p. 201), should be started immediately. I strongly suspect that inadequate formulas which have furnished far too few nutrients to allow tiny brains to develop normally are responsible for a large percentage of premature infants who become mentally retarded.

A special evening bottle. To insure that both mother and child get a good night's sleep, it seems to me wise to make up a special stick-to-the-ribs evening bottle for the healthy baby who has had no colic or other digestive disturbances. Since fat stays in the stomach longer than does any other food, 2 teaspoons of cream or 1 teaspoon of vegetable oil and lecithin might be put into this bottle. Proteins also have a high satiety value; an egg yolk or a little undiluted yogurt or evaporated milk and/or 1 or 2 teaspoons of yeast might be added to the evening feeding. A healthy baby given such a bottle often sleeps through the night by the time he is a week old. I used a concentrated evening bottle in feeding our daughter and have recommended it to dozens of mothers. We have been delighted with the results.

When the baby seems hungry. Every infant should be on a demand schedule, in that he should be allowed to eat as much and as frequently as he wishes. When the baby appears to be hungry soon after taking a bottle, it usually means he wishes to be loved, fondled, and included in the family social life. If he is really hungry, however, it is far better to add more nutrients to the formula, making it like the evening feeding, than to introduce solids.

Provided the baby is two months old or older, the entire formula can be made somewhat more sustaining by adding to it 1 egg, larger amounts of yeast or yogurt, perhaps ½ cup of undiluted evaporated milk, 1 or 2 tablespoons of non-instant powdered whole milk, or 3 or 4 tablespoons of instant powdered milk with 1 tablespoon or more of light cream. If more than 2 tablespoons of yeast are given daily, a yellow spot can sometimes be noticed in the diapers; this color is caused by the excretion of vitamin B_2, supplied by the yeast, and would probably indicate that the amount of yeast might be decreased slightly.

Because babies need much experience in sucking, the formula must not be made too concentrated or satisfying. Two mothers of beautiful "Adelle Davis babies" have told me recently that their children, both about eight months old, "ate almost nothing." Neither child seemed to care for vegetables, meats, or even fruits. After some questioning, I discovered that each baby was being given a formula almost thick enough to slice; no one could have been hungry after drinking it.

In my opinion, a child to be truly superior should have approximately a quart of milk daily from the time he is about two months old and continuing throughout his entire growth period. Neither solids nor additions to formulas should be allowed to decrease his milk intake.

Air swallowing. Apparently all babies swallow air, regardless of the type of formula or bottle used, especially when allowed to become overhungry before being fed. If not burped up, the air heats to body temperature, expands, and may cause pain or "colic" before it passes through the intestines and is expelled. Often air gulping and the resulting distress convinces both mother and physician that the formula is disagreeing with the infant. Actually such distress can be caused merely by sucking a pacifier.

It is probably impossible to prevent a baby from swallowing air. The best way to decrease air swallowing, however, is to be particularly careful to hold the infant so that his esophagus is up and down every minute that he is sucking. In this way, swallowing is done largely by gravity rather than by force. If you will try drinking a glass of water while lying flat on your back, you can see what the problem is. The claim of "anticolic bottles" implies that the air an infant swallows comes only from inside the bottle; such bottles are no more anticolic than is a human breast. The air which is swallowed is largely pushed into the stomach from the back of the mouth and throat.

When all goes well. In shopping for bottles, look for ones with wide mouths, with holes already in the nipples, and with nipples which an older baby cannot remove. You can determine whether such a bottle is satisfactory in other respects only after you have used it. The problems which can arise from the mechanics of bottle-feeding have caused many a baby to be taken off a good formula and given a succession of increasingly inadequate ones.

If all goes well and non-collapsible bottles are used, there should be a steady stream of air bubbles going into the bottle as the baby nurses. For most babies, these bubbles should be about ⅛ inch in diameter, allowing the infant to empty the bottle in approximately 20 minutes. When the bubbles are ¼ inch in diameter or larger, the baby is usually being forced to gulp air to such an extent that he may throw up and/or suffer from colic. Such bubbles indicate that the nipple holes are too big or that too much air is getting into the bottle. If the baby does throw up, have colic, or finish the bottle in less than 20 minutes, buy new nipples and/or tighten the air inlets. If he continues to throw up, buy different bottles.

In case no bubbles can be seen, make sure the nipple holes are open. If they are and still no bubbles appear, the air inlet is faulty, and the baby is sucking against a vacuum. Even when the bubbles are tiny (1/16 inch in diameter or less), the baby is probably sucking against a partial vacuum. The air inlet is also inefficient whenever air bubbles rush into the bottle as soon as it is taken from the baby's mouth, but in this case the nipple holes are also too large.

When should bottles be stopped? Because sucking is so extremely important (p. 150), my conviction is that a baby should be allowed a bottle as long as he wants it; and that an adequate formula should be continued as long as you want a healthy child. When a youngster has satisfied his need for sucking, he will give up the bottle of his own accord. Both of my children enjoyed their bottles until they were about three years old, and neither resorted to thumb sucking for comfort. Many four- and five-year-olds want bottles temporarily when they do not feel well or when a new bottle-fed baby demands most of the mother's attention. I see no reason why they should not be allowed a bottle regardless of age.

There are many advantages to continuing the formula until a baby wishes to give up the bottle. If prepared as suggested in this chapter, it is far more nutritious than any food one can possibly offer; hence, when it is enjoyed, there need be no worry about whether the child eats other foods or not. The mother will therefore not be tempted to urge him to eat foods he does not want; thus unpleasantness and the resulting feeding problems are avoided. A baby weaned to a cup will often refuse milk with yeast and other nutrients added; during an infection he may refuse all foods and thus markedly prolong his illness. If he still enjoys his bottle, however, it is surprising the amount of food he may take and how quickly he recovers.

If continued formula making seems like a chore, merely put some pep-up prepared for yourself into nursing bottles. A child brought up on a yeast formula willingly accepts breakfast pep-up with the family and has already formed a food habit which can benefit him for years to come. By this adequate, high-protein drink the no-breakfast problem is solved; the blood sugar remains normal, and alertness at school is assured; resistance to infections is kept high; and a thousand unforeseen problems which can arise later are already avoided.

With your selection of your baby's formula, you can determine his food habits for years to come. You may also determine whether your child will be physically and mentally superior or belong to the vast pool of mediocrity.

CHAPTER TWENTY-ONE

Nutritional Supplements for Babies

Provided a mother is on an excellent diet, a breast-fed infant may not need supplements. The minute the child starts to wean himself, however, supplements must be given if he is to maintain the health he has already achieved. For the bottle-fed baby not receiving colostrum, vitamin E should be given the first day of life and other supplements started no later than the third day, especially if the birth has been premature. For all children, supplements should be continued throughout the entire period of growth.

It should be noted that the recommendations in this chapter might differ from those made by many pediatricians. They are nevertheless based on scientific studies.

Need for vitamin A. This vitamin, essential before protein can be synthesized, is required by every cell in the body, including each cell in the brain. Vitamin A prevents infections by keeping cell walls so strong that viruses and bacteria cannot penetrate the tissues, and by enabling the cells to secrete a mucus which contains a virus- and bacteria-destroying enzyme, lysozyme. Few nutrients are so important for the health of the eyes; and without it, experimental deafness has been produced. Vitamin A is essential for the development of normal bones and of the enamel and dentine of the teeth; a deficiency can cause the skull to stay so underdeveloped that room for the brain is limited.

Extent of vitamin-A deficiencies. A third or more of American children have been found to be markedly deficient in vitamin A, and some are even said to be threatened with blindness. Millions of children in the developing countries still go blind because of vitamin-A deficiencies. Severe deficiencies of this vitamin are now rapidly increasing in

America because physicians are recommending skim milk for babies and growing children; unless the diet contains at least 7 per cent fat, vitamin A is not absorbed or carried in the blood. Furthermore, physicians rarely recommend vitamin E, and even when generous amounts of vitamin A are given, unless vitamin E is adequately supplied, any vitamin A is quickly destroyed by oxygen. Many vitamin-A deficiencies are produced, therefore, not by a lack of this vitamin as such, but because too little vitamin E is available to protect it.

Vitamin-A requirements. Numerous factors, such as exposure to glare, rate of growth, the amount of fat in the diet, and many others, cause the amount of vitamin A needed daily to vary constantly. For example, infections, fevers, stresses, any type of illness, and particularly drugs destroy vitamin A and/or increase the need for it. Similarly, nitrates from chemical fertilizers, which now contaminate most of our foods, destroy this vitamin. Mineral oil, in which vitamins A, D, E, and K readily dissolve, is often slathered on small babies; it passes through the skin into the blood, picks up these vitamins, and causes them to be lost in the feces, thus producing vitamin deficiencies.

About 5,000 units of vitamin A daily appear to meet the needs of most infants, though 10,000 units daily may be more advantageous when the intake of nitrates is high. Probably no more than 10,000 units daily should be given to a child under five years old except, perhaps, during a severe illness, such as the measles (p. 258).

Supplying vitamin A. In my opinion, by far the most beautiful babies are those given, as a vitamin-A-and-D supplement, natural fish-liver oils. I prefer old-fashioned cod-liver oil, but drops of concentrated fish-liver oils are also excellent, *provided these oils are kept continuously refrigerated and always given with vitamin E.* Concentrates supplying vitamins A, D, and E together are now available. These vitamins, however, are more efficiently absorbed from oil than from concentrates. For this reason, concentrates should be given immediately after a formula which supplies fat. So little of these vitamins can reach the blood from capsules that vitamin-A-and-D supplements in capsule form should not be relied upon for children. I gave both of my youngsters a teaspoon of cod-liver oil daily until they were 12 years old, then changed to capsules. When fish-liver oils are introduced early, babies do not object to the flavor.

The synthetic water-soluble or water-miscible vitamin-A preparations which pediatricians usually recommend are not stable; they have been found to lose most of their potency after a few months, whereas the vitamin A in oil remains unharmed. Furthermore, the synthetic vitamin A is so rapidly destroyed in the body by oxidation that it quickly uses up any available vitamin E.

The tasteless, odorless drops of water-soluble vitamin A, which can be added to the formula, are understandably easier for a mother to give. Fish-liver oils adhere to the sides of bottles and must therefore be put directly into a baby's mouth after he has been fed and burped. The supplement should be given following the last feeding before his bath, so that a baby who drools is not left smelling like a fish market. Because it is more difficult for a tiny baby to swallow much oil, I recommend that a mother introduce a fish-liver concentrate (available at health-food stores) during the first week of life and continue 5 or 10 drops daily for the first four or five months. At that time she might change to a teaspoon of cod-liver oil daily, which can be advantageously continued until the child is grown.

Always read labels carefully and know exactly the amount of fish-liver oil which will supply 5,000 units of vitamin A.

Vitamin-A toxicity. An excessive amount of vitamin A can be toxic, but this fact has been publicized out of all proportion to the actual harm done. For example, no deaths have been reported, whereas more than 300 children are accidentally killed each year by eating aspirin. Any mother, however, should be aware of the symptoms of vitamin-A excess: itching, dry skin, lack of appetite, irritability, rash, loss of hair, headache, drowsiness, vomiting, and pain and swelling of the long bones.

The danger of vitamin-A toxicity has been investigated with amazing thoroughness; and, fortunately, recovery is consistently rapid. According to scientists of the National Academy of Sciences—National Research Council, when toxicity has occurred, all symptoms have usually disappeared in one to three days after the vitamin has been withdrawn.

Amounts reported to have produced toxicity vary widely. Since the water-soluble preparations of vitamin A absorb far more rapidly than do fish-liver oils, they have caused most of these cases of vitamin-A toxicity; and tolerance to excessive amounts supplied by fish-liver oils is so high that danger of toxicity is most unlikely.

Vitamin C, E, or cholin each renders excessive vitamin A harmless. A child on an excellent diet, therefore, could tolerate quantities of vitamin A which might be damaging to a malnourished youngster. Despite this margin of safety, more than 10,000 units are rarely needed.

Mercury poisoning in ocean fish. The reports that Pacific Ocean fish contain mercury have caused mothers to question the wisdom of allowing their children to have cod-liver oil. Since the amount of oil given is small, mercury toxicity seems unlikely. Most of the cod-liver oil used in America comes from Newfoundland or Norwegian waters.

The B vitamins are essential. All the vitamins in the B group are essential, as part of enzyme systems, to every cell in the body. They help in producing energy; in utilizing fats, carbohydrates, and proteins; and in preventing cholesterol from clogging the baby's arteries. The first symptom of a vitamin-B_1 deficiency is said to be brain damage, though each B vitamin is necessary for normal brain function.

Valuable intestinal bacteria, thriving on breast milk, produce sufficient B vitamins for the fortunate infant who is nursed. If yeast is added to a formula and gradually increased to perhaps 2 tablespoons daily, the B-vitamin needs of an artificially fed baby can easily be fulfilled, especially if he also gets some yogurt or acidophilus. To supply still more of these vitamins, small amounts of liver and wheat germ should be introduced to all children soon after they are six months old. A sick infant or one who has never tasted these foods, however, will probably refuse them even though he desperately needs all the B vitamins. About the only way to meet his requirements is to give a concentrate of these vitamins available in syrups sold at health-food stores.

Proportions of B vitamins are important. The action of the B vitamins is synergistic, meaning that all work together, each enhancing the others. When a few of the B vitamins are given in large amounts without the others, the need for the vitamins omitted is so increased that deficiencies of them can be produced. Pediatricians frequently recommend vitamin drops furnishing a little vitamin B_1, B_2, perhaps B_6, and niacin amide. Such preparations undoubtedly do far more harm than good and, in my opinion, are dangerous. What better way to produce allergies, for instance, than to increase the need for pantothenic acid, essential to the production of cortisone?

The proportions of B vitamins found in normal human and animal tissues are thought to be best for maintaining health. They are approximately as follows: for every 3 milligrams of vitamin B_1, there should also be 3 milligrams of vitamins B_2 and B_6; 18 milligrams of pantothenic acid, niacin amide and PABA; 600 milligrams of cholin and inositol, and 9 and 15 micrograms of vitamin B_{12} and biotin respectively. The 0.1 milligram of folic acid allowed appears to be adequate for a baby.

When you buy yeast or a B-vitamin supplement, read the label carefully. If a product does not furnish all the B vitamins in the group in approximately the same proportions given here, look for a different brand.

Requirements of B vitamins vary. Little is known about the amounts of each B vitamin needed by infants except that they vary widely with individuals. For example, most babies are said to require 3 milligrams of vitamin B_6 daily; to prevent signs of a deficiency or xanthurenic acid (p. 29) from appearing in the urine, other infants require 10 milligrams or more. Families susceptible to allergies appear to have a high hereditary need for pantothenic acid; the requirement appears to be about 15 milligrams daily for a non-allergic child. In general, I have found it best to supply the B vitamins from natural sources—yeast, liver, wheat germ, and yogurt or acidophilus—and resort to concentrates principally during illness.

The B vitamins dissolve readily in water; therefore they are so quickly lost in the urine that an excess is not toxic.

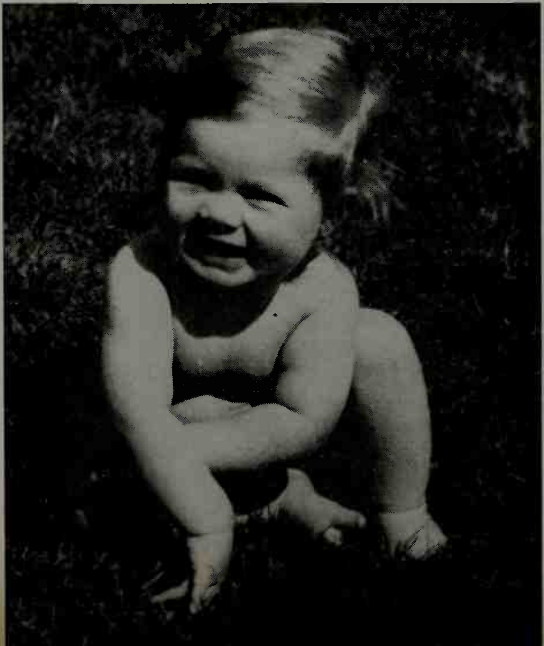
Use vitamin C liberally. The advantages of using vitamin C generously are almost endless: it protects your child from anemia, allergies, and infections; decreases the need for B vitamins by stimulating the growth of intestinal bacteria; reduces the harm done by drugs, food additives, nitrates, and other foreign substances reaching the blood; and speeds recovery from almost any type of illness (p. 254). Fortunately, this vitamin is not toxic, even in amounts 10,000 times those usually recommended. For these reasons, you may at times want to protect your baby with larger amounts of vitamin C than he is already receiving from his formula or breast milk.

If the vitamin-C solution (p. 176) is not added to the formula, sweeten with honey to taste and keep refrigerated. Give directly from a spoon or from a bottle.

Diarrhea sometimes occurs if the vitamin-C intake is increased rapidly; a gradual increase is well tolerated. Yet massive amounts of this vitamin may save a child's life during a severe infection (p. 253), provided it is not lost because of the diarrhea. If generous amounts are given day after day, no such problem arises when large quantities are needed.

The contours of an infant's face during the first weeks of life show the inherited bone structure.

If the diet has been adequate, the facial proportions of a year-old child will be the same as they were at birth.



The adequacy of the diet during the first six months largely determines the attractiveness of the adult.

These pictures, of our daughter, Barbara, were taken at two months of age, on her first birthday, and when she graduated from high school.

Vitamin D is vitally important. When vitamin D is adequate, a protein produced in the intestine carries calcium into the blood, thus allowing the normal development of bones and of well-spaced, decay-resistant teeth. Vitamin D also increases the absorption, retention, and utilization of magnesium, as well as of calcium, and throughout life it decreases the losses of both minerals in urine and feces. Another finding of tremendous importance is that this vitamin also increases the excretion of phosphorus in case of overload (p. 173) and of excess sodium (p. 263). Without vitamin D, rickets, a bone disease, is produced by the time a baby is three to six months old.

Sources of vitamin D. The dependable source of vitamin D used to be the sun acting on the oils not in but *on* the skin. Now too few babies are exposed to sunlight, and the oils on the skin in which vitamin D might be formed are quickly washed off, especially when soap is used. Some American children have no vitamin D whatsoever in their blood during sun-filled summers. Even in such sunny countries as Greece and Israel, 50 per cent of the babies 14 weeks old, including breast-fed infants, were found to have rickets.

A vitamin-D supplement is particularly important for your baby because this vitamin is not found in ordinary foods. Fish-liver oils are by far the best and the richest natural sources. Somewhat synthetic water-soluble preparations of vitamin D in drops, however, are recommended by most pediatricians. Rickets is now rapidly increasing in America, however, both because less vitamin D is being added to milk than formerly and because pediatricians are recommending skim-milk formulas; without fat, even so-called water-soluble vitamin D cannot be well absorbed.

The toxicity of vitamin D. An excess of vitamin D can be toxic, but such toxicity appears to be caused only by water-soluble concentrates of this vitamin. The National Academy of Sciences—National Research Council, in referring to "preformed vitamin D in the livers of fish," states: "There is no evidence that ingestion of even very large amounts . . . causes vitamin-D toxicity." Furthermore, toxicity occurs only when the diet is markedly inferior; it can be prevented if the diet is adequate in protein or in vitamins A, C, E, or cholin Each of these nutrients also speeds recovery from toxicity.

The symptoms of excessive vitamin D are weakness, weight loss, nausea, vomiting, diarrhea, abdominal cramps, high blood calcium, demineralization of bones, and deposition of calcium in soft tissues. In England, so much synthetic vitamin D was added to milk, baby foods, formulas, and cereals that infants were getting 4,000 units or more daily. Many developed symptoms of toxicity, and five babies died. Fortunately, after the vitamin was stopped, most recovered quickly. When examined years later, these survivors were in good health. It now appears that amounts of water-soluble vitamin D, or irradiated ergosterol, above 1,000 units daily, may be toxic to most babies.

A mother should know exactly how much vitamin D her baby is receiving from the various foods given him. Read labels carefully. If his intake should ever appear excessive, immediately decrease the vitamin D but increase vitamins C, E, and other nutrients which prevent toxicity.

Quantity of vitamin D needed. The recommended daily allowance of vitamin D is 400 units for infants, children, and adults alike. This quantity may be based far more on fear of toxicity than on knowledge of the actual requirement. Instead of worrying about toxicity, the obvious solution is to use only the non-toxic natural sources of this vitamin from fish-liver oil.

Analysis of pooled breast milk collected from hospitals showed that it contained 966 units of vitamin D per liter, or approximately a quart. This quantity probably approaches the ideal daily intake far more than the 400 units generally recommended, provided only natural vitamin D is used. Because I am convinced that it produces by far the most beautiful children, I recommend only natural fish-liver oils as a supplement of vitamins A and D. A fish-liver-oil concentrate, supplying 1,000 units of natural never-toxic vitamin D, together with 10,000 and 100 units of vitamins A and E respectively per 10 drops, can be started the day a baby gets home from the hospital and continued daily until he is four or five months old. At that time cod-liver oil can be introduced and ½ to 2 teaspoons daily should be continued throughout the growth period. From the first months of life, however, the amount of vitamin D given should depend on the rate of growth. A large, rapidly growing baby with heavy-boned parents probably needs twice the amount of vitamin D required by a small, slow-growing child. Usually 1,500 to 2,000 units of fish-liver-oil vitamin D daily have been given to ricketic children. Because drops of water-soluble vitamin D have been toxic, I feel they should be avoided.

Most breast-fed babies have excellent bone structure without vitamin-D supplementation provided the mother's intake is high. Severe rickets do occur in breast-fed infants when the birth is premature, or when the mother's health is poor or she has had several babies in quick succession, especially if solids are given early. Since natural sources are not toxic, it seems to me wise for the nursing mother to take vitamin D herself and also to give some to her baby, being careful to increase the supplement immediately when he starts to wean himself.

Innumerable mothers err by giving too little vitamin D or even none at all. Because of this oversight, their children often remain needlessly homely throughout life.

Vitamin K is easily obtained. Deficiencies of vitamin K, which prevent blood from clotting and cause hemorrhaging, are common in newborn infants. One cause of cerebral palsy, for example, is thought to be vitamin-K-deficiency bleeding in the brain or spinal cord. The blood starts to clot normally as soon as vitamin K is given, provided it is well absorbed.

Valuable bacteria in the intestinal tract, thriving on breast milk, immediately produce vitamin K for the newborn who is nursed. Such bacteria, however, are not quickly established in a bottle-fed newborn infant. For this reason, the bacteria from yogurt or acidophilus and milk sugar, upon which they live, should be added to the first day's formula unless the infant has received some colostrum.

Like natural vitamins A, D, and E, vitamin K can be absorbed into the blood only when fat is given; and deficiencies are now increasing because skim-milk formulas are being used. Both skim-milk and low-fat soy-milk formulas have allowed severe and uncontrolled hemorhaging to occur and to continue for weeks before the cause was detected. Baby boys on such formulas have often bled excessively during circumcision, though this heavy loss of blood could have been prevented had the infant been nursed or before surgery given yogurt or 1 to 5 milligrams of vitamin K.

By destroying intestinal bacteria, oral antibiotics taken at any age can produce vitamin-K deficiencies, which result in oozing of blood or hemorrhaging in almost any part of the body; again the cause frequently goes undetected for weeks. If a baby is given antibiotics, the mother should be particularly careful to add yogurt and/or acidophilus daily to his formula or food for at least three weeks afterward.

Natural vitamin K appears never to be toxic, whereas the synthetic vitamin is highly toxic in amounts as small as

10 milligrams. A single injection of 1 milligram is adequate to prevent or correct hemorrhaging.

Iron supplements can be dangerous. It has long been known that iron salts can destroy vitamin E. If they are given when the diet is deficient in vitamin B_6 or cholin, excessive amounts of iron can be deposited in the soft tissues, causing damage and scarring, yet anemia may still exist.

Because ample iron can easily be supplied by food, I do not recommend iron supplements. Often iron salts are added to an otherwise excellent preparation of vitamins or minerals. If you wish your child to have such a supplement, give him vitamin E after breakfast or after the first morning feeding and the iron-containing preparation 8 to 12 hours later.

Should fluoride drops be given to babies? I doubt that anyone who has never seen teeth mottled from excess fluoride can imagine how repulsive and unattractive they cause a child to be. Such a mouth is similar to that of a person who has been chewing tobacco. Because I have seen these teeth, I can sympathize with the heartbroken mother whose letter I have before me. She is blaming herself because she has ruined her son's appearance by giving him, while a baby, drops containing fluoride. His permanent teeth, now erupting, are each horribly stained an ugly brown. Unfortunately, her report is only one of many I receive; and several dentists have told me that they have frequently seen ugly fluoride mottling in children given such drops. That an excess in fluoride intake can cause lifelong mottling of teeth is well known.

Fluoride has never been proved to be a body requirement. Generation after generation of rats has been observed, and those given fluoride had no better teeth, nor were they in any way healthier, than the animals receiving no fluoride. Though claims have been made that fluoride increases calcium absorption and retention, studies with humans show the reverse seems to be true, especially if the calcium intake is low. Even tiny amounts of fluoride can destroy a number of enzymes and decrease the oxygen intake of the brain. Fluorine also combines with magnesium to form insoluble magnesium fluoride, thus increasing the already widespread magnesium deficiencies. An excess causes kidney damage, calcification of the soft tissues, and such brittleness that bones break easily.

Though glowing claims have been made that fluoride prevents tooth decay, reports have been conflicting. For example, a U.S. Public Health Service study of Newburgh, New York, one of the first cities in our country to have fluoridated water found that there was slightly more decay after fluoridation than before. In Puerto Rico, after the water was fluoridated for 15 years, 62 per cent of the children were found to have decayed teeth; and the teeth of 64 per cent of the adolescents (ten to 14 years old) showed ugly staining. The doctors making the Puerto Rican study pointed out that no amount of fluoride could make up for an inadequate diet.

A recent survey by the Department of Health, Education, and Welfare revealed that in ten states decay was so rampant that 18 per cent of the children over ten years old had trouble biting and chewing despite fluorides being added to the water in many locales. On the other hand, children of Seventh-Day Adventist families, allowed little candy, have much less decay without fluorides than children drinking fluoridated water. A report of the World Health Organization ridiculously claims that fluoride decreased decay in 30 countries, but then points out that it can prevent decay only *wherever sugar is not eaten.* There is no decay when sugar is not eaten. In India, for example, few sweets are available, and decay is not a problem.

It is said that rarely if ever have such huge sums of money been made available for publicity purposes as the astronomical amounts which have been paid for the claims that fluoridation can decrease tooth decay. Aluminum interests formerly spent millions getting rid of poisonous fluorides; now they sell them to fluoridate water supplies. The implication that decay could be prevented merely by obtaining fluoride while large amounts of sweets could still be eaten gained the enthusiastic support of the soft-drink industry, the candy and bakery industries, and any others which made money by selling sweets. Their propaganda to laymen, dentists, and pediatricians, almost impossible to distinguish from fact, has been ruthless, convincing, and certainly widespread.

Most people eat at least some foods grown in areas where water is already fluoridated. In addition, dozens of industries now pour fluorides into our atmosphere; thus much fluoride is being taken into our bodies through air pollution. Still more fluorides from such pollution contaminate the animals and plants we use as food. We may therefore already be getting too many fluorides.

The *American Journal of Diseases of Children* cautioned editorially that fluoride is indeed a potential poison and that the dosage is still inaccurate. I personally feel extremely frightened that so many pediatricians are recommending fluoride drops to babies. Under no circumstances would I recommend them.

Supplements especially designed for infants. The supplements now given to most infants appear to be harmful in many ways: the vitamin A is unstable; too few B vitamins are supplied; vitamins C and D are inadequate; the fluoride is, in my opinion, dangerous; if a mistake is made in dosage, both vitamins A and D can be toxic; and far too many essential nutrients are omitted.

Good supplements are available, and they must be given if your child is to be superior.

CHAPTER TWENTY-TWO

The Most Neglected Vitamin

Of all the vitamins, certainly one of the most neglected is vitamin E. Since its lack causes so much suffering, I feel this nutrient deserves a chapter by itself.

Few pediatricians recognize vitamin-E deficiencies. Not only do they usually neglect this vitamin; they often become hostile at the very mention of it. Scarcely a day passes but that some mother quotes her doctor as having said: "Your baby doesn't need vitamin E; stop giving it"; "It's dangerous and will harm your child"; "It'll make him too sexy"; "Vitamin E is in every food you eat"; or some other totally erroneous statement. An English physician, concerned because I discouraged the use of iron salts, wrote me that the only thing vitamin E could do was to prevent sterility, information outdated by 50 years.

My husband has a favorite expression which he uses when someone passes falsehood for fact: "It isn't that he doesn't know anything. It's only that so much of what he knows is not true." Similarily, much of what many physicians seem to know about vitamin E is amazingly inaccurate.

The information in the following pages is summarized from more than a hundred scientific papers pertaining to an infant's need for vitamin E. Many of these papers report studies conducted by research teams in the pediatrics departments of such outstanding medical schools as Johns Hopkins, University of Pennsylvania, University of Toronto, and numerous others.

Essential to life. Vitamin E is necessary for the synthesis of DNA and RNA (p. 41), hence for the formation of all body cells, including those in the bone marrow, muscles, eyes, and brain. This vitamin is also tremendously important because it protects vitamin A, carotene, and the hormones of the pituitary, adrenal, and sex glands from being destroyed by oxygen. Furthermore, when vitamin E is undersupplied, the essential unsaturated fatty acids forming part of all cell walls are destroyed by oxygen, causing cells throughout the body to break down. A substance, creatine, released largely from muscle cells thus destroyed, is thrown off in the urine. One test by which scientists detect a vitamin-E deficiency is to analyze the urine for creatine. The quantity of creatine excreted shows the severity of the vitamin deficiency.

As the essential unsaturated fatty acids are being destroyed, a number of harmful substances (such as malondialdehyde) are formed which inhibit cell division and the synthesis of DNA. These substances also damage body proteins and numerous enzymes. Moreover, the tissues are hurt by the deposition of an abnormal pigment known as ceroid pigment, which consists of the essential fatty acids after oxidation has taken place; and the more of these fatty acids a tissue contains, the heavier are the deposits of pigment.

If vitamin E is adequate in the diet, the destruction of cells, vitamins, and hormones and the formation of ceroid pigments are prevented, and the body's need for oxygen is tremendously decreased. Even if the vitamin is given after a deficiency occurs but is not yet too severe, both such destruction and the formation of pigments are stopped. If a deficiency is allowed to continue unchecked, however, irreparable damage is done, especially to the muscles, which no amount of vitamin E can reverse.

Vitamin-E deficiencies in infants. Blood analyses show that all newborn infants are extremely low in vitamin E. As a result, the essential fatty acids in the walls of the red blood cells, which are exposed to larger amounts of oxygen than cells elsewhere in the body, break down to such an extent that an anemia, known as hemolytic anemia, is often produced in the first days of life.

Another test for a vitamin-E deficiency is to determine how quickly red blood cells break down in the presence of oxygen. Such tests show that the red blood cells invariably disintegrate whenever vitamin E drops below 0.5 milligram in a half cup of blood (100 cc.). The greater the amount of oxygen, however, the more rapid is the breakdown of blood cells. For example, some of the early astronauts, breathing an atmosphere of pure oxygen, developed this identical type of anemia; and as much as 20 to 30 per cent of their red blood cells was destroyed. Later such anemia was prevented by vitamin-E-enriched foods. This type of anemia, however, has been produced in volunteers merely by a diet lacking vitamin E, and it is common in persons of all ages.

Healthy babies are born with an excess of red blood cells, some of which normally break down soon after birth. In a vitamin-E-deficient infant, however, half the blood cells may be destroyed; and giving the vitamin quickly decreases this breakdown from 50 to 2 per cent. Such vitamin-E-deficiency anemia is particularly severe in premature infants and occurs in all of them not allowed the vitamin. In many cases, their premature births were probably induced by vitamin E deficiencies (p. 29).

This type of anemia, however, has been completely prevented in premature infants by giving them by mouth 200 to 800 units of vitamin E on the first day of life. Starting as late as the third day has quickly corrected the anemia and increased the red blood cells. When produced experimentally by a lack of vitamin E, this anemia cannot be prevented or corrected by any other nutrient.

As worn-out red blood cells are destroyed—a continuous life process—their coloring matter forms a pigment, bilirubin, which is usually excreted in bile soon after it is formed. When vitamin E is deficient, however, many blood cells are destroyed so rapidly that this pigment cannot be excreted quickly enough; so much of it accumulates that it settles into the tissues, causing the tiny baby to become jaundiced.

Brain damage from vitamin-E deficiency. When many red blood cells are rapidly destroyed in the absence of vitamin E, the amount of bilirubin becomes abnormally high in the blood, a condition physicians speak of as hyperbilirubinemia; thus concentrated, this pigment is highly toxic to the brain cells and can quickly cause irreversible brain damage. Bilirubin soon disappears from the blood, and both the anemia and the jaundice are corrected, provided vitamin E is allowed, or if breast milk or colostrum, rich in vitamin E, is given; so little vitamin E is in formulas that the condition of bottle-fed infants often becomes progressively worse and their brain damage may be severe.

A lack of vitamin E can harm the brain in still other ways. A deficiency creates oxygen starvation, because the available supply is so wastefully used up in the destruction of cells, hormones, and vitamins. The minute anemia is produced, the undersupply of oxygen becomes even more acute. A lack of oxygen can cause mental retardation (p.

127) and is believed to increase the incidence of cerebral palsy.

It is not yet known to what extent a lack of vitamin E is responsible for the tremendous amount of brain damage suffered by children who have been born prematurely (p. 127). In all probability, an untold number of heartbreaks could be prevented and uncounted millions of taxpayers' money saved if vitamin E were given to babies.

Why deficiencies are increasing. Vitamin E, once generously supplied by foods, was obtained from unrefined breads and cereals and all natural sources of vegetable oils. The vitamin is now completely lost when grains are milled and oils are refined. Because of the processing of foods, vitamin E in the American diet decreases each year; hence pregnant women have less to pass on to their babies. The only means left to be sure of obtaining adequate amounts of this vitamin is through supplements.

Aside from refining, vitamin E is destroyed by nitrates from commercial fertilizers, which find their way into milk or water used in formulas. These nitrates can cause kidney damage and be fatal to babies, though the harm can be prevented if vitamin E is allowed.

Analyses show that infant formulas and baby foods are "grossly deficient in vitamin E," though a few commercial formulas contain 5 units per quart. To make this already bad situation worse, the popular use of skim-milk formulas prevents both the absorption and transportation of vitamin E in the blood. Like vitamins A, D, and K, vitamin E must be carried across the intestine wall by being combined with an ingredient of bile, present in the small intestine only after fat is eaten. Even formulas of cows' milk with only half of the cream removed and other types of low-fat formulas allow vitamin-E deficiencies to develop.

In one study, tiny premature babies were kept on cruelly deficient diets lacking all essential fatty acids and vitamin E until anemia was produced (paid for, this time, by a company marketing baby formulas). Since no fat was allowed, however, the anemia was not corrected when 10 to 25 units of vitamin E were given daily.

Though it has been known for 50 years that iron salts destroy vitamin E, so much iron is added to commercial formulas, baby cereals, and supplements for infants that it destroys much of the meager vitamin E a baby may obtain. In fact, by adding 15 milligrams of ferrous sulfate to formulas, vitamin-E-deficient anemia has been purposely produced in infants who were receiving the vitamin.

The more iron salts added to baby foods, the more vitamin E must be given if health is to be maintained. Many of the cereals prepared especially for babies and fortified with 60 to 90 milligrams of iron—usually ferrous sulfate—per 100 grams, or about ½ cup, are definitely dangerous.

Fortunately, if the mother's diet is adequate, breast milk supplies vitamin E. Colostrum, the first milk secreted, is seven times richer in the vitamin than later milk, but as long as a baby is nursed the amount of vitamin E in the blood usually remains high. In contrast, the blood vitamin E of formula-fed babies decreases by the third day of life and remains low for months. If nursing mothers have used oral contraceptives, however, their vitamin-E requirement skyrockets to the extent that jaundice and anemia can be produced in their babies. These abnormalities can be prevented if the mother takes more of the vitamin or gives it to the baby.

Oil increases the need for vitamin E. In one study, pediatricians at the Columbia University College of Physicians and Surgeons compared groups of newborn infants when given breast milk, cows' milk, or formulas containing corn or cottonseed oil. The babies receiving breast milk and cows' milk remained healthy even though cows' milk offered little vitamin E. Using oil in the formulas, however, caused a rapid decrease in the vitamin-E content of blood and such an increase in the breakdown of red blood cells that anemia was produced.

Dozens of studies show that oils increase the need for vitamin E, sometimes as much as 400 per cent; and that the more oil given, the worse the vitamin-E deficiency becomes. Almost every investigator has stressed that *it is dangerous to add oil* to any person's diet without simultaneously increasing vitamin E. Despite these facts, most pediatricians, unless using skim-milk formulas, now recommend formulas containing oil but without allowing vitamin E.

Vitamin E is non-toxic. Even in tremendous amounts, this vitamin is generally considered never to be toxic. One adult, taking 8,000 units daily, however, did develop a sore mouth and tongue. As much as 3,000 units of vitamin E have been given daily to babies with no recognized sign of toxicity. There appears to be no reason, however, for giving huge amounts.

The vitamin-E requirement. The quantity of vitamin E needed daily by babies is unknown. Research does indicate that some individuals may require four times more than others, even when the oil intake is the same. The requirement, however, always increases in proportion to the intake of oils, including cod-liver oil.

During the first month of life, an infant given a cows'-milk formula has been found to average at most 12 units of vitamin E daily, compared with 154 units (not including colostrum) for the breast-fed child; thus babies who are nursed have high levels of vitamin E in the blood by the sixth day of life. In contrast, the National Academy of Sciences—National Research Council now recommends for infants 5 units of vitamin E daily.

Some scientists consider the minimum quantity of vitamin E compatible with health to be 30 units daily. Infants have been given each day such varying amounts as 11.5 units, which could not prevent anemia; 150 units; 200 to 800 units, sometimes starting the first day of life; and for premature infants with jaundice, 1,400 units daily for seven days, at which time the quantity was reduced. I gave both of my children 100 units daily throughout their growth period. Even though the quantities given vary widely, pediatricians who have done research on vitamin-E deficiencies recommend that a supplement be given to all bottle-fed infants. It is equally important, however, that such a supplement be allowed daily for every baby who is nursed, starting as soon as he decreases his intake of breast milk. Moreover, vitamin-E supplements for all children should be continued indefinitely.

Look for d-alpha tocopherol acetate. Certain natural foods contain several substances, known as tocopherols, which have some vitamin-E potency. The only one which is stable, and thus the only dependable source of vitamin E, is d-alpha tocopherol acetate. Most natural vitamin E, measured in units, is distilled from various vegetable oils, but largely from soybean oil destined to be used for paints. Synthetic vitamin E is also available, but is usually measured in milligrams, which denote the same potency as units.

Drops of natural vitamins A, D, and E together, or fish-liver-oil concentrate and d-alpha tocopherol acetate combined especially for infants, are available at most health-food stores. Capsules of vitamin E alone can be purchased having almost any potency from 30 to 1,000 units each. A capsule can be pierced with a needle and squeezed directly into a baby's mouth. For older children, chewable vitamin-E tablets are available. My youngsters seem to enjoy chewing the capsules.

For a tiny baby, I now recommend the fish-liver-oil concentrate combined with vegetable oil, supplying in 10 drops 10,000, 1,000 and 100 units of natural vitamins A, D, and E respectively. This supplement should be given after a formula containing fat. At about six months of age, I suggest changing to 1 teaspoon daily of cod-liver oil and 100 units of vitamin E in drops or capsules.

Following are the important facts about vitamin E: unless a baby is breast-fed, start the supplement the very first day of life; use the natural vitamin E rather than the synthetic; avoid unstable mixed tocopherols; give only the stable d-alpha tocopherol acetate; and continue the vitamin E supplement throughout the entire growth period.

Crib deaths. Sudden unexpected deaths of apparently healthy babies are said to be increasing rapidly, and now number an estimated 20,000 to 25,000 fatalities per year. These babies are mostly two to four months of age; about 70 per cent of them are boys. Such deaths never occur in totally breast-fed infants and rarely in partly breast-fed ones.

In spite of a tremendous amount of research, the cause of these deaths remains a mystery. Autopsies show some mild inflammation of the heart muscles, myocarditis, and slight edema and hemorrhaging in lungs and heart. Underdeveloped parathyroid glands, enlarged thymus, virulent infections, unobserved seizures, smothering, and allergies to milk have all been blamed. The milk-allergy theory is the most popular, despite the fact that blood analyses have repeatedly shown such allergies have not existed.

Hundreds of investigations have been made and millions of dollars spent, apparently with no thought being given to faulty nutrition. Yet among every species of laboratory and farm animal lacking vitamin E, some of the young frequently die suddenly while having all appearances of health. Autopsies of these vitamin-E-deficient animals show symptoms nearly identical to those found in crib deaths of infants: pulmonary edema, hemorrhages, and degenerative changes in the heart muscles; the terminal stage develops so rapidly that it is over in hours.

Stock breeders and scientists who have studied vitamin-E deficiencies are no longer mystified about crib deaths. For example, Dr. D. F. L. Money of the Department of Agriculture at Wellington, New Zealand, points out the marked similarity between the sudden deaths of vitamin-E-deficient baby pigs and deficient bottle-fed infants. A Texas cattleman told me about his beautiful sleek calves and healthy-appearing cattle dying like flies on the open range. There had been a drought, but hay was plentiful. The agricultural assistant eventually pinpointed the problem: no vitamin E, normally supplied by grass seeds, was available. Because of the drought, the grass had not formed seeds. "All the little calves died first," he remarked. "Just like the crib deaths in babies."

Perhaps this problem could be solved if the tissues of infants dying of crib death were analyzed for vitamin E.

Muscular dystrophy. The disease of muscular dystrophy starts so innocently that you can see it clearly only in retrospect. The doctor might have mentioned anemia, but you think little of that; so many children are anemic these days. The baby's head was wobbly at first; he was slow to sit up, and he walked and crawled late. His pot belly and rounded shoulders did not worry you, but he fell down too often and he had such difficulty in getting up. He seemed well developed, with large firm muscles. (Scar tissue can be both bulky and hard.) By the time you realized something was wrong and the diagnosis was made, the doctor told you that nothing could be done; the disease was always fatal. And you learned that it progressed from crutches to wheel chair to bed to coffin to heartbreak. Such are the characteristics of this disease.

One of the first abnormalities to occur when vitamin E is undersupplied is that, as cells break down throughout the body, the muscles become weak. Gradually the destroyed muscle cells are replaced by inert scar tissue, heavy with ceroid pigmentation (p. 200). When so much destruction has occurred that muscles can no longer function, the abnormality is diagnosed as muscular dystrophy.

Every variety of animal kept on a diet deficient in vitamin E develops muscular dystrophy, provided it lives long enough. The disease is produced much more rapidly if the diet is also deficient in protein or vitamins A or B_6, but vitamin E alone corrects it if given early enough. When pregnant animals partially lack vitamin E and their young, in turn, are kept on vitamin-E-deficient diets, muscular dystrophy develops at an early age, especially when oils are given.

Autopsy studies indicate that experimentally produced muscular dystrophy is identical to the human disease. This illness is said to have doubled in the past ten years. Scarcely a week passes that I do not have a letter from some desperate mother, begging for help, which she has usually asked for too late. If the disease is caught in the early stages, however, large amounts of vitamin E, together with an adequate diet, sometimes retard its progress.

Vitamin E and cancer. For years animal experimentation has indicated that vitamin E plays some role in cancer prevention. Cancers can be easily produced by injections of coal-tar dyes, especially in animals receiving no vitamin E; controls allowed the vitamin remain cancer-free or their cancers are fewer, smaller, and slower in developing. Giving iron salts to destroy vitamin E has also allowed induced cancers to grow rapidly, whereas animals fed no iron stayed healthy. Similarly, estrogen, which markedly increases the need for vitamin E, has caused cancers to grow; yet a larger vitamin-E intake has protected estrogen-fed animals. Furthermore, cancer transplants thrive when the diet is "normal," but shrivel and fall off if generous amounts of vitamin E are given. Cancers have also been produced by mineral oil, which robs the body of vitamin E; and this vitamin has prevented experimental cancers caused by x-ray and various types of radiation.

More than 20 years ago it was shown that when groups of animals fed vegetable oils or lard were injected with cancer-producing dyes, the oil-fed animals developed twice as many cancers as did the others. It has been known for years that oils increase the need for vitamin E; and investigators have repeatedly warned that it is dangerous to add oils in the diet without simultaneously giving this vitamin. Such warnings have been unheeded.

The studies of Dr. Otto Warburg, twice the recipient of the Nobel Prize in Medicine, indicate that vitamin E is vital to cancer prevention by its ability to decrease the need for oxygen. Without this vitamin, oxygen is extravagantly used up, causing tissues to suffer from the lack of it. When the oxygen supply is adequate, normal cells function and reproduce. If the oxygen supply is too decreased, normal cells can no longer exist, but cancer cells can grow rapidly. In fact, Dr. Warburg has caused isolated cultures of normal cells to change into cancer cells in a matter of hours, merely by reducing the available oxygen. A lack of vitamin E is, of course, only one of many factors which can interfere with the amount of oxygen available to the cells.

The price paid. It has been repeatedly pointed out that illnesses related to vitamin-E deficiencies have become progressively more numerous and more severe as this nutrient has been discarded or destroyed during food processing. If we glance for a moment at the over-all damage associated with such deficiencies during pregnancy, we see that they cause many miscarriages (p. 29); varicose veins, phlebitis, and pulmonary embolisms (ch. 6); premature births and stillbirths (p. 95); malformed and mentally retarded children (p. 41); and anemia in mother and child alike (p. 201). Extreme harm is also done by the destruction of vitamin A and the pituitary, adrenal, and sex hormones in the absence of vitamin E. Add the serious problems caused by abnormal clot formation, coronary thrombosis, and strokes, and you can see that, collectively, failure to recognize this vitamin already costs our nation trillions of pain-filled hours, billions of dollars, and millions of lives; yet as physicians recommend the greater use of oils, these deficiencies increase.

A glance at the future. We have seen that deaths from cancer almost doubled among volunteers who increased their intake of vegetable oils without adding vitamin E (p. 13). During the early part of this century, cancer in babies was unknown; now it has become a major cause of infant deaths. One can, I am afraid, expect a tremendous increase of cancer deaths in children who have received, without vitamin E, either oil-containing formulas or skim-milk formulas, the first increasing the need for this vitamin, the second preventing its absorption.

I suspect the number of crib deaths has already increased during the past five years. No comparative studies appear to have been made as yet.

Muscular dystrophy among children cruelly doubled in the past decade. It will be surprising if this disease does not triple or quadruple in the next.

The damage being done will eventually be known. Statistics will be coming in within the next ten years. One wonders when the tremendous harm imposed by food processors will no longer be tolerated.

CHAPTER TWENTY-THREE

When Should Solids Be Introduced?

A friend who has been a speech therapist for years told me of the tremendous increase in the number of children requiring such therapy. "They're spoon-fed so much soft food that the muscles used for talking can't develop," she remarked. "Sucking's decreased. Chewing isn't even necessary."

I soon found this information was all too familiar to teachers of young children. One told me, "Only yesterday I asked our kindergarten teacher why she had a free period. She said the speech therapist had to work with 28 children out of her class of 30, so she threw in the other two. The problem's not confined to kindergarten, either. It's in all grades."

This frightening situation alone should cause any mother or pediatrician to question the wisdom of introducing solids early.

Milk is crowded out. A few pediatricians are now emphasizing that by giving solids early, milk is being dangerously crowded out. Milk is by far the most important food for any child during the entire growth period. The intake of milk, however, decreases progressively with the amount of cereals and canned baby foods allowed.

Personal friends have a baby girl whom I first saw when she was six months old. Since both parents are unusually attractive and I knew the child was being nursed, I had anticipated seeing a beautiful youngster. Instead, she is extremely homely. Her facial bones are already badly deformed; an abnormal ridge runs up her forehead and across the top of her head; the lower part of her face is weaselly and pinched. I felt literally sick as I observed her. It was the usual story: solids had been introduced at three weeks and increased to many jars each day. No calcium was substituted for that which could have been obtained from milk had it not been crowded out. At the age of six months, this baby's innate attractiveness *had already been ruined for life;* her brain, deprived of high-quality protein (p. 64), has probably been equally harmed. Neither can ever be corrected. Although this case was more spectacular than most, it is only one of thousands I have seen similarly damaged.

Starting solids as early as the eighth to twelfth week usually causes breast milk to dry up by the time the baby is six months old. Furthermore, a mother who crowds out milk by giving overheated canned baby foods early is substituting an inferior product for a superior one. She is trading an original Van Gogh for a trashy picture.

A miserable failing. Through the millions of centuries preceding this one, infants were fed nothing except breast milk during the first year of life. As long as they were nursed, they grew well, slept soundly, and certainly did not suffer from hunger. Bottle-feeding grew popular, however, before enough was known about nutrition to make formulas adequate; hence many infants became anemic. Solids were first introduced, usually at four or five months of age, in the hope of preventing such anemia.

Repeatedly, surveys have shown how completely the early feeding of solids has failed to achieve its purpose. As many as 64 per cent of the infants stuffed with baby cereals and canned baby foods are often still anemic, and some are even severely deficient in iron. In one study, 75 per cent of the babies given solids early were not receiving a third as much iron as they needed. A group of pediatricians found that most of 4,146 babies were anemic when only six months old, despite having been fed canned baby foods. Other infants given cereals especially designed for them and dangerously high in iron (p. 202) still suffered from anemia. Giving solids also failed to cause babies to sleep more soundly or to improve health in any other way. Until the widespread deficiencies of vitamins B_6, E, and other blood-building nutrients are overcome, one can scarcely expect canned baby foods to correct anemia.

Do solids supply nutrients? The point of giving solids to babies is presumably to increase their intake of essential nutrients. Actually, many studies made by pediatricians associated with various medical schools show that babies are far worse off nutritionally when given solids early than if allowed only breast milk or an adequate formula. For example, a group of infants whose parents were largely college instructors were found to be deficient in calcium, iron, and vitamins A and C, despite having been fed liberally on canned baby foods. Other studies showed that infants given commercial formulas and canned foods obtained far less than the Recommended Daily Allowances *of all nutrients,* especially of iron, vitamins A and C, and all the B vitamins.

The earlier the solids were introduced, the greater were the nutritional deficiencies; and the tiny babies stuffed with solids suffered more abnormalities than did the larger or older ones. The lucky infants were those whose parents had little money and/or had not finished high school; these babies received far better diets than did the children of college graduates. Fortunately, their mothers could not afford canned baby foods. They probably followed their innate instincts as to nursing. In any case, the babies received much more milk and retained more protein, calcium, vitamins, and even iron than the children of wealthier or more educated parents.

Analysis of foods canned for babies shows them to be deficient in most nutrients, especially magnesium, pantothenic acid, folic acid, cholin, and vitamin E, which is even lacking from baby cereals fortified with wheat germ.

A cause of allergies. Again and again doctors have warned that solids introduced early predispose infants to allergies; and they have repeatedly pointed out that the digestive systems of young infants are far too immature to handle solids. One medical journal states that "allergists are almost unanimous" in agreeing that early feeding of solids increases the danger of allergies; and, furthermore, that no value is derived by starting such foods before six months of age. An allergy to wheat, so often caused by the early feeding of baby cereals, may be particularly dangerous in that sensitivity to the wheat protein, gluten, may set the stage for celiac disease and perhaps, much later, for schizophrenia. Though giving solids early does not improve health, avoiding them until a baby is six months old tremendously reduces allergies.

One can scarcely deny that allergies have steadily increased with the ever earlier introduction of solids. I recall being thoroughly disgusted when my daughter, while in the sixth grade, brought home a mimeographed sheet on which I was to list her allergies. Children are even expected to have allergies and to be unhealthy these days!

Future fatties in training. For years pediatricians have been preoccupied with having babies gain weight, often overlooking the fact that no child overstuffed with sugar and starch is healthy. They have given sugar water in hospital nurseries and formulas loaded with oversweet sugars, thus forcing infants to develop a taste for sweets from the first day of life. The important weight gains of normal growth occur without a child ever tasting sugar.

Infants given solids early quickly learn that they must eat to please Mother—who must give canned foods to please Doctor—and that eating heartily wins love and approval. The eating-to-get-approval pattern is thus established, frequently causing obesity throughout adult life. Such early feeding therefore predisposes a child to obesity and to diabetes later, even though he may not be fat during babyhood.

More than 10 per cent of our adolescent children ten to 13 years old—the generation brought up on oversweet formulas and canned baby foods—are already obese. Half the youngsters who were fatties as infants are seriously overweight by the time they are six years old; furthermore, they stay overweight. Thus millions upon millions of overfed babies have become unhappy fat children, miserable fat teenagers, and self-hating fat adults. Fortunate infants allowed only breast milk for the first six months rarely become overweight either as babies or adults.

Salt excess may be dangerous. Breast milk contains only a small amount of salt (sodium), though the fact that babies have survived on it since time began shows it to be adequate. In contrast, cows' and goats' milk supplies four to five times more sodium. Infants given commercial formulas and canned baby foods, salted to appeal to a mother's taste, often have blood sodium levels considered to be dangerously high.

Excessive sodium can harm the kidneys and cause high blood pressure and death from strokes, abnormalities unknown in countries where little salt is eaten. Sodium from salt is absorbed in the blood, and though it passes through the kidneys, 99.5 per cent is reabsorbed; hence the amount in the blood accumulates day after day, and the kidneys, whose job it is to get rid of the excess, are given a progressively greater load. The kidneys of infants, however, are so immature that they cannot excrete this excess but can be irreversibly damaged by it. For example, babies started on solids when three weeks old had far more dangerously high blood sodium than infants first given solids at nine weeks. The kidneys of premature infants are especially harmed by a high sodium intake, particularly if table sugar (sucrose) is added to their formulas.

When 30 varieties of canned baby foods put out by four leading companies in the United States were fed to young rats as a sole source of sodium, high blood pressure within the fatal range developed in four months; baby rats receiving similar foods without excess salt remained healthy. Other studies showed that the earlier salt was given and the larger the quantity, the more rapidly and suddenly high blood pressure developed and the sooner the animals died. High blood pressure, once produced, cannot be reversed by giving a salt-free diet. Kidneys can be further damaged and permanent high blood pressure eventually produced also by a deficiency of cholin, a vitamin lacking from most foods canned for infants.

The harmful effects of excess sodium from canned baby foods cannot become obvious for years. They do establish, however, a lifelong taste for salty foods. The sodium from foods, together with that obtained from drugs, baked products (soda and baking powder), water passed through softeners, and some 300 food additives, usually causes kidney damage and/or high blood pressure sooner or later.

I found one medical report which states that 11 per cent of our school children—the canned-food-stuffed generation—have high blood pressure when ten to 13 years old. On a single day last summer I worked out diets for two girls and a boy, ages 11 and 13, who had already suffered strokes and paralysis from high blood pressure. As babies, two had disliked lumpy foods; another had had difficulty in swallowing; all had been given canned baby foods for approximately two years. My secretary clipped a note to one of the diets: "Here's a preview of things to come." I hope she is wrong. I am afraid she is right.

Potassium losses. Eating salty foods causes an immediate loss of potassium in the urine. This loss can induce infant colic (p. 241) and digestive disturbances. It may also play a role, as yet apparently not investigated, in causing crib deaths (p. 205). Potassium is essential to the contraction of muscle tissue, yet it leaves the cells when sodium becomes excessive. A loss of potassium from the body has been known to cause death from heart failure; and malnourished babies, given excessive salt, have similarly died of heart failure. Furthermore, such a loss of potassium from the cells of the heart muscles now appears to be a major cause of sudden death from heart failure among adults. Even if little salt is eaten, potassium leaves the cells whenever magnesium is deficient. This nutrient, low in baby foods, pediatricians rarely consider important.

Nitrites have caused death. A number of infants have died because of nitrates from chemical fertilizers getting into well water used for formulas. Unless yogurt or acidophilus is given (p. 162), such nitrates can be changed by an undesirable type of intestinal bacteria to highly toxic nitrites. These nitrites react with the red color in the blood cells and prevent them from carrying oxygen, a condition similar to carbon-monoxide poisoning. A baby's tolerance to nitrates is unknown, but a safety limit has been set at 10 parts per million.

Most canned baby foods, however, contain 200 times this amount. Of the canned vegetables, seven varieties were contaminated with more than 1,000 ppm, two others with 6,600 ppm, and one fruit with 5,400 ppm. The content of nitrates is now so high in most commercially grown vegetables that some physicians believe it may be hazardous to introduce them before a baby is five or six months old; babies are less susceptible to nitrate poisoning after this age.

No one knows how much harm is being done to babies by the nitrates in canned foods, but Ralph Nader is quoted as having said, "Many people are trying very hard *not* to find out." It is known that nitrates destroy vitamins A and E and can cause kidney damage; and that stock feed high in nitrates is associated with "almost every type of disease" in farm animals.

Those ever-present pesticides. Last year I lectured in a city where a large firm produces canned baby foods. An amiable and attractive executive of this company attended a party given for me after the lecture. As the evening drew to a close, I asked him, "How about leveling with me? Would you give your own children your canned baby foods?"

He answered without a second's hesitation, "Of course I wouldn't. They contain too many food additives and pesticide residues."

Even on foods canned for babies, labels do not have to include most additives. For example, monosodium glutamate jazzed up baby foods for years before tests on rats and mice showed it to cause obesity and irreversible damage to the brain and eyes. Even now it is removed only temporarily. Sodium nitrite is used to enhance the color of ham canned for babies. No consumer can know how many other questionable additives a baby is being given.

Of 297 samples of canned baby foods analyzed, all contained pesticide residues. Though DDT contamination ranked high, 19 different pesticides were found in the foods examined. Such pesticide contamination, however, was said to be no greater than that in most of our processed foods.

Other disadvantages. There are many other reasons why introducing solids early is undesirable, especially when overcooked canned foods are allowed. These canned foods contain a surprising amount of refined ingredients: cornstarch, white rice, noodles, and sugar added even to vegetables and meats. Most are so high in phosphorus that they increase the danger of phosphorus overload and the tragic loss of needed calcium (p. 173). Jars are often opened in the market, tasted, and resealed if the flavor fails to meet approval; foods thus contaminated can readily cause diarrhea.

One of the most serious problems arising from the early introduction of solids is that it leads to bad food habits later. It is time-consuming, and tired, busy mothers are not always gentle or patient. Unpleasantness soon becomes associated with eating, which causes millions of children eventually to refuse foods and develop severe malnutrition.

Expensive money-makers. Certainly canned baby foods are expensive. I have before me an article from the *Wall Street Journal* which states that babies currently consume 720 jars (60 dozen) during their first year, a not insignificant investment.

About every three months my husband, reading some financial page, asks me, "Guess how much——made this quarter." He mentions the name of some leading producer of baby foods. Each time I suggest a figure which seems astronomical to me but which proves to be minuscule. The report before me states that sales of canned baby foods had soared a record $53 million above the previous fiscal year, which had totaled $202 million; and that the quarterly profit had approached $4 million. It also predicts tremendous increases in sales during the next few years.

One would assume that a company making a profit of approximately $16 million annually could well afford to have foods for infants grown on improved soils high in minerals and humus, free from pesticides and nitrates alike. Let no one, however, be so naïve. Baby foods were never designed to build health. Their purpose is to make money, and that purpose has been successful indeed.

Slowly the pendulum swings. Fortunately, pediatricians are at last recognizing that there is no advantage in introducing solids before six months of age. Medical journals state, however, that it is the mothers themselves who insist on starting solids early as a status symbol, presumably against the will of their doctors. They point out that mothers feel it a credit to themselves if their babies eat, walk, talk, or cut teeth earlier than some friend's child. Undoubtedly this form of ego build-up does exist, but mothers tell me that their pediatricians still insist on their giving solids early, sometimes when their infants are only three weeks old; and many young mothers are terrified to disobey their pediatricians.

There is no question but that prepared baby foods have done immeasurable harm. Certainly they have caused many a superior newborn infant to be changed into a mediocre one. If you intentionally wished to produce children who were physically and mentally inferior, what better way than to crowd out milk by giving them foods of low nutritive value, grown on poor soils, forced with chemical fertilizers, covered with poison sprays, and overheated during the canning process?

Fortunately, the pendulum swings. It cannot swing rapidly enough.

CHAPTER TWENTY-FOUR

An Easy Method of Baby Feeding

When offering solids to your baby, keep in mind that his stomach is small, but that his requirements for growth are enormous. If you want an outstanding child, you cannot waste space on foods which do not build health. All too often some inferior food is substituted for a superior one (breast milk or adequate formula) with every mouthful of solids allowed.

By the time your baby is six months old, however, a varied diet of solids, in addition to milk, becomes desirable. For example, in the study of the relation of early feeding to the intelligence of several hundred school children (p. 143), youngsters with the lowest IQ's were those whose foreign-born mothers breast-fed them for a year or longer without allowing any solids whatsoever.

The easy method. Your method of introducing solids can establish excellent eating habits or ones which create problems for years to come. It seems to me I found the easiest and most nutritionally sound one years ago. As soon as our children could sit up comfortably, they were usually put in the high chair near the dining room table during meals; thus they were included in the family social life and, since children learn by imitation, they could observe how they would eventually be expected to eat. After the first teeth appeared—the signal that a baby is physically and emotionally ready for solids—I started offering tiny bites of nutritious foods prepared for the family; they were usually placed on the high-chair tray for finger-feeding. Thus solids were gradually introduced, but neither of my babies ate regular meals until about the age of eight or nine months. No foods were purchased or prepared especially for them; and neither was allowed baby cereals or canned baby foods.

During the entire first year, however, solids should be offered only after a baby has been nursed or given a bottle.

Quality first. Though young mothers usually wish to know exactly which foods to introduce first, it is far more important to emphasize quality. Grow your own fruits and vegetables if you possibly can. Otherwise, try to obtain ones produced on mulched, rebuilt soils without commercial fertilizers and poison sprays. Also try to locate fertile eggs, safe raw milk, stone-ground, whole-grain flour and/or bread, and meat from animals which have not been given stilbestrol.

After buying the best food you can, be particularly careful not to lose nutritive value during its preparation. Wash fruits and vegetables thoroughly but quickly, never allowing them to soak. Poison sprays, which fall on the ground and plants alike, are picked up in the soil solution and carried into each cell of our fresh foods; no amount of washing can remove them. Bake or steam your vegetables, cook them in milk, or sauté them lightly, but avoid boiling. Always use fresh foods in preference to canned or frozen if at all possible. Should you not know how to cook, learn how, even to making your own bread. It's fun, creative, and can save medical bills.

A mother who prepares only health-building foods for her husband and older children needs to do almost no extra cooking for a baby.

Smorgasbord for babies. You women who worry about introducing solids might feel more relaxed if you knew of an experiment conducted years ago by Dr. Clara M. Davis. Some 18 orphans, all six months old, were allowed to select their own diets, even though none had ever tasted any food except a milk formula. They could have anything they wished from a wide variety of natural foods: sweet and sour whole milk; buttermilk; hard-cooked eggs; various meats, fish and fish roe; a variety of cooked cereals; fruit juices, and raw and cooked vegetables and fruits. No food was salted, but salt was kept on the trays. Foods were not combined in any way; for example, grains were served only as a cereal, not as bread.

Each baby was fed separately and was not allowed to watch while others ate; imitation, therefore, was ruled out. Although a nurse was with each child during his meals, no attempt was made to offer him food; if a baby tried to drink milk from a cup which he could not easily handle, the nurse would help but nothing more. All foods were weighed before being served, and any food left or dropped on bibs or floor was collected and weighed.

Many interesting points were brought out by this experiment. One baby, allergic to egg white, carefully separated yolks from whites, ate the yolks, and tossed the whites on the floor. A child whose bone structure was poor drank cod-liver oil of his own free will 113 times, or until his bones were considered to be normal. All of the babies went on food binges. They would sometimes drink quarts of milk one day and eat little else; the next day they would perhaps scarcely taste milk. One child ate 11 eggs at one meal; another ate 13 bananas at one time. Again and again certain foods would be avoided for a period and then eaten heartily. The salt would sometimes not be touched for days and then eaten by the handful, even though the children grimaced as they ate it. On one day a child would perhaps eat little food of any kind; the next day he might eat tremendous quantities.

Taken on the basis of day to day, the diets were lopsided indeed. When the total food consumption over a period of months was studied, however, it was found that the children ate foods supplying the nutrients they needed. No child was ill during the experiment or even suffered the slightest deviation from health; none developed an allergy or an infection.

This experiment showed that if foods are unrefined and rich in nutrients, it is safe to allow a child to eat as much as he desires without fear of allergies or digestive upsets; and that if a variety of nutritious foods is offered without one grain of sugar or other refined food, a child will probably take good care of himself. It also showed that when children are not urged to eat and are not scolded, nagged, or prodded during meals, they eat heartily of their own accord. During the entire experiment, not one word about a food was ever uttered while the children ate, a record few families could match.

In a similar recent experiment, children from 18 months to three years old were allowed free choice of wholesome foods. Again it was shown that if no refined foods were allowed, the children's own innate wisdom directed them to select foods which met their nutritional requirements and built superb health.

The cautious method. If there are allergies in the family or a baby has had colic or other digestive disturbances, it is wise to introduce only one food at a time, and then give no other new food for five days. At first only a bite or ¼ teaspoon need be offered; when this food proves to be well tolerated, the amount can be gradually increased. If a food does upset a baby, such a tiny amount cannot upset him seriously. At first, avoid mixtures such as stews or hash, so that, if a food does cause a rash, you can know which to withdraw. Eventually let your baby become accustomed to all varieties of tastes and textures, but always stop feeding him the moment he indicates that he has had enough. Under no circumstances should a baby be coaxed, cajoled, wheedled, or forced to eat. A little praise now and again, however, is understood early and often does help.

No salt should be added to any foods for a baby. If you are cooking oatmeal for the family, for example, take out some before salting. Do the same when preparing other foods.

To my way of thinking, the spoons sold for babies are far too big for little mouths. I would recommend that you buy one or more tiny demitasse spoons and let your baby get used to handling them by playing with them during family meals long before he is ready to eat. Such spoons also make wonderful baby gifts.

Iron-rich foods are needed first. A baby who has been nursed has depleted his supply of stored iron by the time he is six months old. For this reason, liver, the richest source of iron, is a good food to introduce first. It can be lightly sautéed, using only enough oil to prevent sticking. Cut it in ⅛-inch pieces and allow your baby to finger-feed himself. Pork, lamb, or calves' liver is preferable to chicken or beef, whose growth is forced with large amounts of stilbestrol.

All meats are good sources of iron. They need not be mashed but merely cut into particles small enough to be swallowed without choking. Chunks of protein foods stay in the stomach longer and therefore digest more completely than do fine particles. Scraped raw beef and bits of unsalted lamb, veal, steak, lean ground meats, chicken, turkey, fish, or solid natural cheeses, such as good cheddars, can be introduced in the same way. Unsalted baked or boiled fish, though lower in iron than beef, is nevertheless excellent, provided it can be obtained without mercury pollution. All smoked and salted fish and meat should be avoided.

Eggs are high in iron. Any baby not already given egg yolk in a formula should be started on eggs at six months of age. Allergies to eggs are caused by raw or undercooked egg white. If a mother is fearful, she should first cook the eggs until firm by bringing them to a boil, then allowing them to stand in the water as it cools, or for about 20 minutes. After the yolk has been given by the ¼-teaspoon-at-a-time method and is well tolerated, uncooked yolk, soft-cooked eggs, and even whole scrambled eggs can be introduced. Egg white is a perfectly good protein which need not be avoided.

Babies enjoy fruits. Most fruits are excellent, provided you can obtain those grown without poison sprays and will avoid the canned and frozen ones with heavy syrup. Raw fruits, washed, peeled, and scraped, are best if they are not too laxative. Bits of peaches, apples, and pears can also be given for finger-feeding. Mashed bananas are a convenient stand-by, and I gave many to my children, but the insecticide residue so often seen on the skin makes me now question their value for a baby. Fresh citrus juices and small pieces of fresh tangerines, oranges, or grapefruit are also excellent. Unsweetened fruit juices are acceptable, but if canned, they have been so harmed by heat that many nutrients are destroyed. Frozen juice frequently contains dyes, sugar, and other additives not always shown on labels.

Mothers are cautioned—without scientific basis, I think —not to give berries because of seeds. Any seeds small enough to be swallowed usually do neither good nor harm. Fresh berries grown on good soil are excellent foods.

I disagree heartily with persons who say to avoid citrus fruits or juices because of allergies. A baby given high-quality breast milk or an adequate formula is not subject to allergies. Like all other foods, however, no more than ¼ teaspoon of fruit or juice should be given at first.

The following fruits, mashed or chopped, if they are fresh and unsweetened, may be given a baby: ripe apricots, peaches, apples, pears, plums, melons, persimmons, papayas, mangoes, tangerines, grapefruit, oranges, pineapple, strawberries, raspberries, and other small-seeded berries, seedless grapes or other grapes with seeds and (at first) skins removed. Unsweetened stewed fresh or dried fruits, such as home-prepared applesauce, are excellent. Prunes are usually too laxative for a baby.

Fruit served over homemade yogurt (p. 98) makes an excellent meal for your baby.

Introducing vegetables. Your baby will enjoy carrots, summer squashes, fresh peas, asparagus tips, and similar soft vegetables prepared for the family; they need only be mashed with a fork. Potatoes, preferably baked or steamed in their jackets and unsalted, are well tolerated, as are baked sweet potatoes and yams. Steamed or baked parsnips and the many winter squashes are used far too infrequently.

Members of the cabbage family—cabbage, cauliflower, Brussels sprouts, and broccoli—are excellent for babies provided they are cooked, preferably in milk, no longer than ten minutes. The gas-forming sulfur compounds these vegetables contain are released only through overcooking.

The following vegetables are recommended for your baby: cooked carrots, peas, celery root, zucchini, all varieties of squashes, egg plant, stewed and ripe uncooked tomatoes, artichoke hearts, okra, asparagus tips, ripe (red) bell peppers and pimientos (delicious sautéed alone in a little oil), cauliflower, rutabagas, turnips, parsnips, and kohlrabi. Any vegetable should be mashed, chopped, or liquefied, depending on the texture. Except for the vegetables allowed for teething, most raw vegetables are digested too incompletely to be of value to a baby. Salads, for example, need not be given until a child is two or three years old. There is also plenty of time later to introduce radishes, onions, leeks, corn, and mushrooms. Soybeans, dry beans, and lentils cause gas too readily to be given to babies.

Breads and cereals are interchangeable. This is a wonderful time to learn to make your own breads of stone-ground, whole-grain flours which have been refrigerated. They are easy to make, fun to knead, marvelous to smell while baking, and delicious to eat.

Before you buy bread, read the labels carefully and select ones made from stone-ground whole grains. Avoid breads which contain preservatives, food additives, dye (caramel coloring), or "wheat flour," meaning refined flour so labeled to mislead you. Watch particularly for the statement "100 per cent whole wheat" or whatever grain is used. Most whole-grain breads handled in supermarkets, and particularly the brown-and-serve rolls, contain far too many preservatives to be recommended.

Unless breads are purchased from a health-food store, rye breads are usually made of refined flour; the dark ones have large amounts of dye added. So-called soy bread ordinarily contains only 20 per cent soy flour and 80 per cent refined white flour. Such breads have little to offer nutritionally. Unbleached white flour has about 35 nutrients removed during refining; avoid it if you wish to build health. Contrary to popular opinion, however, hot breads are not hard to digest, nor is toast easy to digest.

Wholesome breads supply the same nutrients as do unrefined cooked cereals, hence are interchangeable with them. Even the best cereals cannot be recommended if they are to be served with sugar; and if parents eat sugar on cereals, the children will be sure to want sugar on theirs. Using honey or maple syrup on cereals is generally only temporary, and sugar is soon used instead. Unless parents themselves are willing to eat cereals only with whole milk or cream, it is best to forget about cereals and let your child fill up on bread, butter, and milk.

All unrefined cereals served without sugar are excellent for the entire family: old-fashioned oatmeal and rolled oats; wheat germ and middlings; finely cracked wheat; stone-ground mixtures of assorted grains; and similar cereals purchased from health-food stores where they have been kept under refrigeration. A little wheat germ, preferably vacuum packaged, can be added to any cereal toward the end of cooking and the quantity increased as the flavor becomes familiar.

For additional calcium and protein, I usually mix a cup of any cereal to be cooked with ½ cup of non-instant powdered milk before stirring slowly into boiling water. Cornmeal mush, made from coarse stone-ground meal and cooked in this manner, is particularly delicious. Whenever we have it, my husband never fails to exclaim that this is the food which made America great; and our children have loved it since babyhood.

Cooked cereals which are white are refined and usually have 35 or more nutrients largely removed. You insult your child by offering them. Packaged, ready-to-eat cereals sold at supermarkets supply almost no nutritive value. The vitamins and minerals of the original grain have been largely discarded; they are damaged by heat, unbalanced by being "enriched" by a few cheap B vitamins, and contain far too much sugar. No intelligent, informed mother could conscientiously serve them.

Oils are essential. The quantity of polyunsaturated fatty acids, especially linoleic acid, essential to a baby's health can probably be supplied by ½ teaspoon of oil daily. Safflower, soy, corn, peanut, or a similar oil can be used, though a combination of two or more oils is preferable. Oil may be used in sautéeing liver or other foods and for seasoning vegetables, but it should be refrigerated at all times. Even slight rancidity causes the destruction of many nutrients.

Because all oils increase the need for vitamin E, they must not be given unless this vitamin is allowed. Whenever the use of oil is increased, vitamin E must also be increased. Fried foods, certainly those fried in deep fat, should not be given to a baby and rarely to an older child.

Giving cheese to the baby. Cottage cheese is a wonderful ever-ready food for your baby, delicious when served with fruit. My babies ate it almost daily. All natural cheeses are high in protein, and some are rich in calcium but, unfortunately, they are heavily salted. Low-sodium cottage cheese and unsalted cheddars, usually available at health-food stores and some dairies, are preferable. The ordinary cheeses are perhaps all right for healthy babies, especially breast-fed ones, provided other foods are given without salt. The older and healthier the child, the more able he is to excrete excess sodium without kidney damage (p. 212).

All processed cheeses should be strictly avoided.

Foods for teething. Finger strips of dry, hard, unrefined toast and raw carrots and celery are excellent for teething. Sections of raw turnip, kohlrabi, or firm apples are also acceptable. Bones of chicken legs and lamb or pork chops seem to keep babies happy for hours. The sweet, refined toast so often given for teething, however, should be avoided.

Drinking milk from a cup. An infant who has been completely nursed should usually be introduced to milk from a cup or a bottle by the time he is six or eight months old. Unfortunately, a baby who is weaning himself often decreases his milk intake to a pint or less daily, especially when his mother allows him generous amounts of solids. As a result, a beautiful baby who has been superior indeed often becomes mediocre in a few months. Whenever less than 3 cups (24 ounces) of whole milk are obtained daily from the breast, bottle, and cup combined by a baby under a year old, I believe that most solids except yogurt should be temporarily withheld, though egg and yeast should be added to milk as a source of iron.

Formula-fed babies stay far healthier if allowed to take their fortified milk from a bottle as long as they will, perhaps until three or four years old. If such a child should become sick, for instance, he loves his bottle, will continue to eat, and recovers quickly. If only a cup is offered, he often refuses all food. Giving milk from a cup is frequently the beginning of the end of good nutrition. A baby who is happy with yeast from a bottle dislikes the smell of it in a cup; and the mother, perhaps again pregnant, soon tires of fortifying milk which may not be drunk.

It helps tremendously to maintain good nutrition, especially with a baby who has been nursed, if pep-up, which is essentially the same as an adequate formula, is drunk each morning by the parents. Only a tiny amount should be given at first to any child unfamiliar with the flavor of yeast; and a word of sincere praise should follow immediately after it has been drunk. The procedure can be repeated by mother and child at other meals. If amounts are kept small, the pep-up well prepared, the drink never forced on a child, and an example set by the parents, the baby will quickly develop a taste for fortified milk. At such a time, the amount of milk offered in a cup can be increased. It is easier for both mother and child if he is allowed to drink from a covered cup equipped with a straw.

If the milk intake drops below 3 cups daily, simple custards slightly sweetened with honey and such milk soups as cream of spinach soup are excellent in that they combine milk with a source of iron. Milk must not crowd out iron now needed by infants who have been nursed, hence not given yeast and egg yolk in a formula. Milk-induced anemia does exist.

An intake of a quart of milk daily is ideal throughout the entire growth period. Instant powdered milk can easily be stirred into fresh milk when the intake falls below normal, but a tablespoon or more of cream should be added to insure calcium absorption (p. 91). Always keep the proportions of cream to milk as nearly the same as in whole milk as possible. Avoid giving children skim milk.

Foods to be avoided. If you allow your baby only unrefined foods, few need to be avoided. Because nuts may cause choking, they should not be allowed until later, but there are excellent unsalted, smoothly ground nut butters which may be introduced during the first year. Only natural peanut butter, the kind with oil on top, should be allowed at any time. Peanut butter which has been hydrogenated and the varieties with sweets added should be strictly avoided.

Foods seasoned with herbs or a moderate amount of spices are all right for a baby. Any condiments which could cause discomfort, such as mustard or black pepper, should certainly not be allowed.

Luncheon meats, wieners, and most canned meats contain large amounts of nitrates, which destroy vitamins A and E, and other preservatives. Such meats cannot be recommended, nor can smoked or salted meat or fish.

Health or disease? The list of foods which cannot possibly build health includes at least half of the products carried in any supermarket. You as a mother must decide which you wish to produce in your children: health or disease. If you allow them to eat junk foods often enough, they will have neither beauty, energy, nor alert minds.

The junk foods which should be avoided during the entire growth period have been listed earlier (p. 109) and are only summarized here. They include all white-flour products and most packaged cereals; foods containing large amounts of sugar, such as confections, ice creams, and sweet bakery products; all soft drinks, regardless of how sweetened; synthetic fruit "ades" and "fruit" drinks containing sugar, dyes, and chemical flavors, but little or no fruit juice; gelatin products; processed cheeses; and hydrogenated cooking fats and foods cooked in them, such as potato chips.

If your desire is truly to have superior children, these products have no place on your kitchen shelves.

Lifelong food habits are formed. Frequently people ask me if my own children, now that they are adults, are interested in nutrition. The expectation seems to be that an overdose of the subject has probably caused them to reject it. Actually, I sometimes think that both go a bit too far in applying nutrition or are too hipped, yet as I look back on their early years, their attitude is understandable. At that time we were growing most of our own fruits and vegetables; I was baking bread and making yogurt; and both children were raised on raw certified milk, fertile eggs, and, when we could get them, meats produced without stilbestrol. These were the foods they learned to enjoy.

The foods children are allowed during their first years usually become their favorites throughout life. By the time a child reaches the age of five, his food habits are well established. After children start to kindergarten, they are offered junk foods from an ever-increasing number of sources. If their food habits are excellent, however, they will care little for disease-producing foods. Such good food habits will serve them well throughout life.

CHAPTER TWENTY-FIVE

Your Child Has the Right to Be Beautiful

A mother largely determines whether her children will be beautiful or homely, depending on the adequacy of the diet during their first few months. When nutrients are deficient or poorly absorbed, a baby who has been beautiful at birth often becomes homely by the time he is three to six months old; and once allowed to develop, this homeliness remains *throughout his entire lifetime*. Conversely, a mother who sees that all essential nutrients are generously supplied during this first year, and keeps the diet thereafter at least moderately good, will probably have beautiful daughters and handsome sons. There is, however, little time to be wasted; a permanent change can occur rapidly and cruelly.

Appearance is determined largely by the development of the bones. The truth of this statement was impressed on me by an article I chanced to read on missing persons. It seems that certain detective agencies have specialists who are so familiar with the placement of muscles and soft tissues that, if given the bare skeleton of an unknown person, they can reconstruct the face so perfectly that friends and relatives can instantly recognize this individual. It is understandable, therefore, that misshapen and underdeveloped bones cause a person to be ugly, whereas excellent skeletal devlopment insures lifelong attractiveness. For this reason, every mother should learn to recognize normal and abnormal bone structure so that she can take steps immediately if correction is needed.

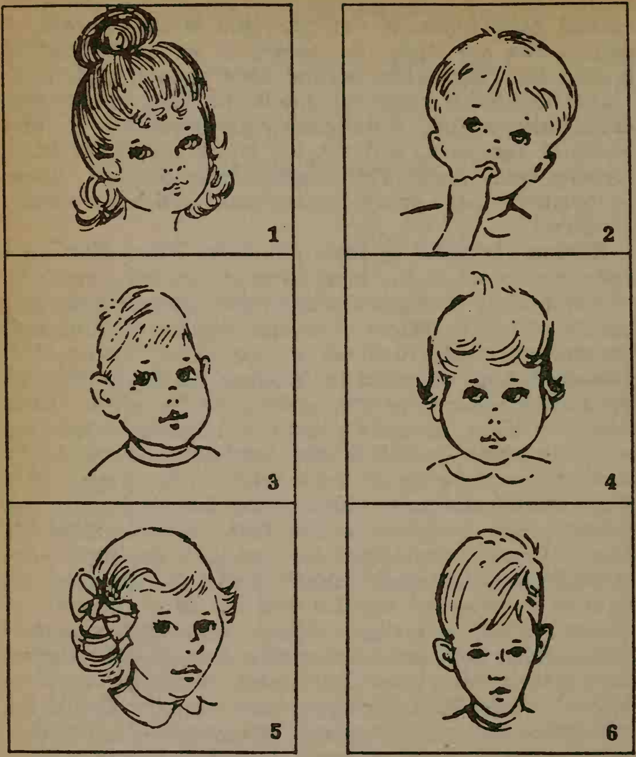
That bulging forehead. If you look at a well-nourished baby's profile, the forehead is as straight as that of any attractive adult. A bulging forehead, which is usually the first sign that bones are not developing normally, always indicates poor skeletal growth throughout the body. On close observation, the head can often be seen to bulge also above the ears. Such bulging, which can appear as early as the third month, especially in infants stuffed with canned baby foods, is not bone but an overgrowth of cartilagelike substance. It appears to be an attempt to protect the brain when normal bone cannot be formed. Unless the diet is improved, similar cartilage overgrowths cause enlargements of the chest bone (sternum), the arm bones at the wrist, and the leg bones inside the knee, forming knock-knees. The bulging forehead usually disappears later, but the poorly mineralized facial bones remain abnormal.

Endless variations in bone structure. When diets have been inadequate in the bone-forming nutrients, the faces of children as they grow older show almost an endless variety of malformations. The face may be narrow, with perhaps a receding forehead or chin. Often there is shallowness through the cheekbones where the middle third of the face is underdeveloped, and on profile seems almost concave. When the middle and lower thirds of the face are both underdeveloped, the forehead appears to be flared or overhanging, giving a child the appearance of a thug. If only the lower third of the face is normal, the mouth seems to protrude like that of a Cro-Magnon, whereas an underdeveloped jaw can give the appearance of weakness and stupidity. Malformed jawbones cause the teeth to be crowded together and out of alignment; for this reason almost every American child must now have orthodontia. Frequently the entire face has a pinched look; sometimes children have faces which seem to have become elongated; and narrow faces are now almost the rule rather than an exception. I feel genuinely alarmed at how frequently I see children three and four years old whose entire heads are so small that there is obviously no room for normal brain development (p. 43).

Regardless of the variations, every malformation detracts from beauty. Furthermore, underdevelopment of facial bones is accompanied by flat, narrow chests, flared or underdeveloped lower ribs, narrow pelvic bones, and other skeletal abnormalities.

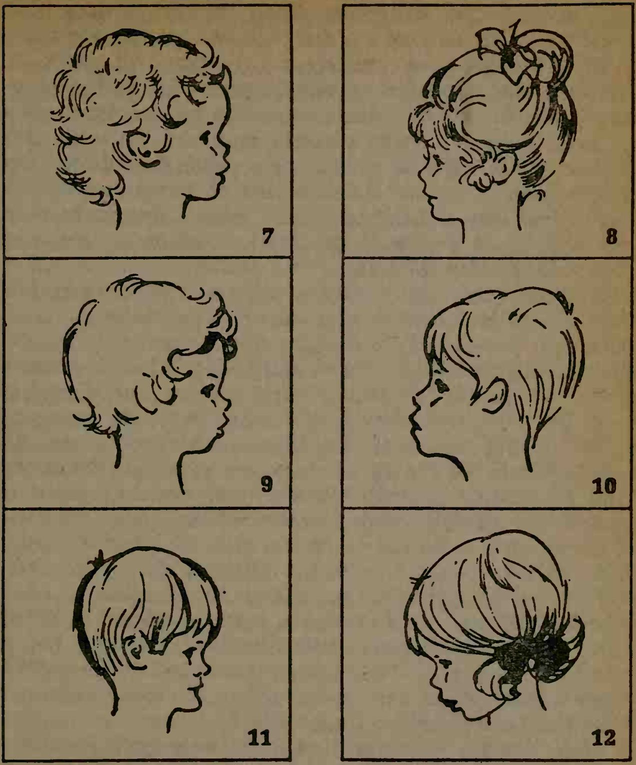
Whenever you are around children, carefully observe their bone structure and see how many deviations you can recognize. You will be surprised at how quickly you can become an expert.

Heredity is important. As soon as your baby is a week or two old, have pictures taken both full-face and profile. Also get photographs showing the tiny barrel chest and, if



Facial Deformities and

1. Normal bone structure, showing width through all parts of face and wide spacing between eyes **2.** Abnormal overgrowth of cartilage-like base of bone above ears **3.** Underdevelopment, especially through upper third of face **4.** Abnormal bone structure allowing eyes too close together and too deeply set **5.** Underdevelopment through lower third of face **6.** Stunted growth of entire skull, allowing inadequate space for brain



Normal Bone Structure

7. Abnormal, bulging forehead **8.** Normal profile **9.** Underdeveloped chin **10.** Underdevelopment through upper two-thirds of face **11.** Underdevelopment through center third of face **12.** Buck teeth, resulting from faulty bone growth you have a boy, his narrow hips. *These pictures are your permanent record of your child's heredity.* If his diet is kept adequate as he grows older, the proportions and contours of his face, chest, and hips will remain the same as at birth, though at puberty a girl's hips will widen as feminine characteristics appear. A poor diet during pregnancy can cause bone development to be abnormal even at birth; therefore, baby pictures may not show the full genetic potential, but at least no child should develop poorer bone structure than he had at birth. Actually, I have never seen a small baby with a long, narrow face or one who showed any of the malformations so common now among older children.

If about every six months a mother will compare her baby's bone structure to that shown in his baby pictures, observing particularly the slant of the forehead for the slightest suggestion of a bulge and seeing if his face seems to be elongating, becoming more narrow, or changing from his inherited proportions in any way, she can improve his diet the minute any abnormality is observed. As soon as skeletal-building nutrients are supplied, the bones tend to become normal. Usually poor bone structure is blamed on heredity and accepted as inevitable because some relative is similar in appearance. The fact that the diets were inadequate in many nutrients during the relative's own childhood is completely overlooked. I once heard a man and wife express a more intelligent point of view. They were not especially attractive, but they had a beautiful little girl. The mother remarked to me, "We often wonder which one of us might have looked like her if we had been raised on a good diet."

Unfortunately, because diets have become progressively worse, the reverse is more often true. Almost daily I am appalled at the number of attractive parents I see with homely children. Unknowingly they have settled for mediocrity.

Every nutrient is needed. In one way or another, probably every nutrient plays some role in the building of normal bones and teeth. A lack of protein, magnesium, calcium, and/or vitamins C and D, however, can retard skeletal development or cause it to cease temporarily. Phosphorus is equally important, but it is so generously supplied that it is rarely if ever lacking.

Unfortunately, too little calcium is usually obtained, largely because canned baby foods are allowed to crowd out milk. Moreover, little of that calcium reaches the blood when children are given skim milk, for without fat calcium cannot be absorbed (p. 91). Magnesium, which is necessary before calcium can be deposited, gives hardness to the teeth and bones but is usually deficient in children's diets. A diet should supply half as much magnesium as calcium. When magnesium is undersupplied, calcium already in the bones is withdrawn and laid down in soft tissues or lost in the urine; thus bones become porous, break easily, and heal slowly.

If an infant gets too little protein, which again is crowded out by baby cereals and canned baby foods, the base of bones which hold the minerals cannot be formed normally, and much of the small amount of calcium which has been absorbed is lost in the urine. Vitamin C, when available, gives strength and elasticity to bones, but unless it is adequate, the protein base cannot be formed. Premature babies are frequently given no vitamin C and can often drink so little milk that they do not receive enough calcium and protein to build normal bones; and since they have had less time to deposit calcium before birth, they are particularly susceptible to rickets. Unless both the mother's diet and the formulas are unusually adequate, the bones of twins are generally malformed. Other babies are sometimes given formulas so diluted with water that they cannot drink enough to supply the nutrients needed. Furthermore, sugars, such as corn syrup added to the formula in large quantities, prevent calcium from being absorbed. While these influences and the intake of calcium, magnesium, protein, and vitamin C are all vitally important, vitamin D is even more essential. Without vitamin D neither calcium nor magnesium can be efficiently absorbed into the blood, laid down in bones or teeth, or prevented from being excreted in the urine. A deficiency of vitamin D is therefore recognized as most often causing widespread faulty bone structure during babyhood and later years of growth.

The tragedy of ugliness. The ugliness now so prevalent among American children is far more tragic than is usually recognized. Almost every child hates himself if he is not reasonably attractive. This problem could be largely prevented or readily corrected if pediatricians and parents recognized abnormal bone build. Experience and conditioning have made me unusually aware of it.

For years, when the late Dr. Weston A. Price (p. 234) was traveling throughout the world studying the bone structure of peoples living on unrefined diets, I heard him lecture repeatedly and saw thousands of his pictures. He found that when such people ate their native foods, their facial bones were broad, their eyes widely spaced, and their cheekbones well developed; and the lower third of their faces was so wide that their jawbones were sufficiently large to permit the teeth to be even and straight without crowding. Their chins were strong and broad and in no case receding.

These studies were made before the airplane destroyed the isolation of certain groups on every continent. Yet almost to a person, as long as they lived entirely on unrefined food, the men were attractive and the women beautiful, regardless of the vast differences in races. Without exception, every individual had a wide face and all had teeth as even as piano keys.

Dr. Price also found people of the same races who had adopted the worst features of a white man's diet, chiefly foods which can be shipped without spoiling: white-flour products, refined sugar, canned foods, and coffee. Children raised on such a diet were different indeed from their parents who had lived on native foods. Almost every type of skeletal malformation could be found: narrow, "shallow" faces; thin, elongated foreheads; eyes crowded together. The distance between the ears was perhaps a third less than that of the parents. Furthermore, almost 100 per cent of these children had narrow jaws and crowded teeth, horribly out of alignment. Pictures of these people can be seen in Dr. Price's excellent book, *Nutrition and Physical Degeneration,** which I think should be in every public library, especially in every school library.

In a few instances, Dr. Price found families of three living generations where the grandparents had grown up on native foods and the parents had lived in a white man's settlement and been raised on an inferior diet but, before having their children, had returned to remote spots where only natural food was again available. The bone structure of these third-generation children resembled that of their grandparents, not that of their parents. The faulty development of their parents could not be inherited.

Rickets is rapidly increasing. Where severe bone abnormalities occur in babies undersupplied with vitamin D, the condition is spoken of as rickets, which comes from an old English word *wricken*, meaning "to twist." Years ago this disease was almost universal

My first job after finishing dietetics training was at the Judson Health Center in the lower New York City tenement district, where the patients were largely Italians who had emigrated from southern Italy and Sicily. At the baby clinics, held several times each week, my instructions were to listen to the physician's diagnosis and then to tell the mother how to feed her baby, the points to stress depending upon the diagnosis. The diagnoses, however, were in part always the same: rickets, rickets, rickets.

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*This book can be obtained from the Price-Pottenger Foundation, Inc., 137 North Canyon Boulevard, Monrovia, California 91016.

The several fine pediatricians who gave their time to the clinic also trained us to recognize poor bone structure. "The forehead should be flat and straight with the general line of the face, never rounded or bulging," they often told us. "As you look into the infant's face, the bone above the ears should be a straight line with the cheekbones below; it should not flare outward. There should be width of bone between the eyes and from the outer edges of the eyes to the ears; and the eyes should not be set too deeply in the head. When the baby is lying flat, look closely at the chest; it should be broad, rounded, and barrel-shaped, not narrow or flat, and the lower ribs should not flare out. When the child is held in a standing position, the stomach should not bulge, nor should the sternum be raised into a pigeon chest." There were other instructions about straight legs and normally developed wristbones. After months of such training, we no longer saw dimples and long eyelashes but bone abnormalities.

To each mother we stressed the importance of giving the baby cod-liver oil or cod-liver oil concentrate every day and of taking him to the roof for sunbaths. But cod-liver oil cost money and made the baby smell bad; and to reach the tenement roof the mothers had to climb perhaps six flights of stairs through halls as dark as midnight even on the sunniest days. (When we made home calls, we carried flashlights with us.) Besides, no one had ever heard of giving babies cod-liver oil in Italy, and they had grown all right.

Some of the mothers, however, gave the oil conscientiously, and we watched the bulging foreheads and flared ribs gradually change to normal; their babies became beautiful children. Other mothers gave the oil part of the time, when they remembered it or could afford it. The enlargements of their babies' bones disappeared, but the skeletal structure remained underdeveloped. The little faces stayed narrow, perhaps with receding jaws and slanting foreheads, the eyes too close together, and the chests hollow and underdeveloped. These children were homely, and their bone structure showed slight resemblance to that of their parents. Other mothers gave neither cod-liver oil nor sunbaths, and their babies grew to be ugly, misshapen children, though most of these babies were nursed and canned baby foods were not yet marketed. It was vitamin D or lack of it which determined whether their children were beautiful or ugly.

After cod-liver oil or its concentrate was given to all babies, and since water-soluble vitamin D was not yet available, even mild rickets practically disappeared. Infants were then given 900 to 1,800 units of natural vitamin D daily from non-toxic fish-liver oils, and they were indeed beautiful babies. Because many pediatricians now practicing received their training during this period when rickets was rarely seen, the disease was so little emphasized that these doctors do not even recognize abnormal bone structure. As a result of the use of skim-milk formulas, which prevent the absorption of fat-soluble vitamin D, rickets is again increasing rapidly in both the United States and Canada, and knock-knees, bowed legs, pigeon chests, and bulging foreheads all help to make our children unnecessarily homely. Moreover, partly because adequate calcium and magnesium are not being absorbed, a baby lacking vitamin D is usually irritable and restless, sleeps little, cries and perspires easily and is difficult to be around. His teeth are often late in erupting. His walking is usually delayed. His tiny backbone may curve inward, causing him to be swaybacked (lordosis), which may not be noticeable except that it makes his stomach protrude into a pot belly. His diet should, of course, be immediately improved. If sufficient vitamin D is given, the bones will gradually become more normal, but whether the damage already done can be completely rectified depends on the age of the child and how adequate his diet is in all other respects.

You can save money. Teeth which are well formed and evenly aligned in a wide dental arch contribute much to beauty. While your baby is still tiny, therefore, observe the inside of his mouth. His dental arch, or the jawbone where his teeth will erupt, should be almost a perfect semicircle and sufficiently large to allow plenty of room without crowding. Many babies have this type of dental arch at birth, but because of inadequate diet it usually becomes the shape of a U or even a V by the end of the first year. The roof of his mouth, or dental vault, should be low and rounded like the roof of a Quonset hut, not like that of a Swiss chalet built for snows to slide off quickly. You might make sketches of his dental arch and vault and keep them with the baby pictures which are to be your record of his heredity. By comparing the shape later with these early sketches, you can tell if his bone development is becoming abnormal, and improve his diet accordingly. It is now known that when bones are truly strong, such pressures as thumb sucking do not throw them out of alignment.

If the diet during pregnancy is adequate in other respects, the amount of vitamin D obtained can determine the size of jawbones, the time at which the teeth will erupt, the position of the teeth in the jaw, and the thickness and density of both the enamel and dentine. The pregnancy diet, however, is important principally in the formation of the baby teeth, but if excellent, by increasing the thickness and hardness of the enamel and dentine, it can decrease the susceptibility to decay. Not only are the permanent teeth forming during the months after birth, but all the bones of the oral cavity should be rapidly developing. If any nutrient necessary for normal skeletal growth is undersupplied or lacking, the bones will be small and fragile; the tooth enamel will be thin, poorly calcified, and contain pits and fissures; and under a microscope the dentine can be seen to be so poorly mineralized that it appears to have the texture of honeycomb. No amount of fluorine can prevent such teeth from decaying rapidly. Moreover, the underdeveloped dental arch will cause the permanent teeth to be crowded together and add still more to the unattractiveness of the child.

When thousands of children's baby teeth were examined microscopically, it was found that if they were densely mineralized, 78 per cent remained free from decay, whereas only 6 per cent escaped decay when the structure was poor. In another study, English school children, given cod-liver oil or a natural fish-liver-oil concentrate as a source of vitamin D over a period of 13 years, had markedly fewer cavities than youngsters not receiving the vitamin. The vitamin D from sunshine also decreases decay. For example, American children living in the Southern states have only half as much tooth decay as do the youngsters living near the Canadian border; and less decay occurs in years when sunshine is most abundant, in comparison with the foggy, rainy years.

There are many causes of decay aside from too little vitamin D. For example, Deaf Smith County, in Texas, has become famous as an area without a toothache, the cause presumably being the abundance of calcium in the soil. Investigations, however, showed the difference was due to a higher magnesium intake. A neighboring county where decay was rampant had 5½ times more calcium than Deaf Smith County but only half as much magnesium. I find no report of the magnesium content of teeth in Deaf Smith County, but analyses of human bone showed five times more magnesium than in the bones of persons living in a neighboring county. When magnesium has been given to school children, decay has been markedly reduced.

Persons lacking vitamin B_6 are especially susceptible to decay, apparently because the number of bacteria in the mouth is tremendously increased. When niacin amide is undersupplied, numerous plaques prevent saliva from neutralizing acids as they are produced, and again decay becomes rampant. The major cause of decay, however, which fluorides have been unable to prevent (p. 197), is eating refined sugar in its many forms. The fact that 98 per cent of our children suffer from tooth decay, with an estimated 700 million cavities still unfilled, shows the sheer magnitude of our national malnutrition.

Decayed teeth, like crowded ones and underdeveloped bones, also detract from a child's attractiveness. On the other hand, when the diet is kept adequate, so much money can be saved on dental bills, especially if orthodontia is avoided, that the expense of supplements is more than justified.

Other advantages of normal bone structure. It is said that when the facial bones are normal, the well-developed sinuses give a pleasant resonance to the voice; and that only persons with such sinuses can become great singers. The fact that many opera singers come from Italy may be related to the abundance of vitamin D from sunshine. Conversely, when the facial bones are small and poorly developed, the sinuses are susceptible to infections, and pus can drain from them only slowly, often backing up to cause pressure face-aches and headaches.

Similarly, people with wonderfully developed chests have the lung capacity to make outstanding athletes, and they are less susceptible to respiratory infections than individuals with poor bone structure. Their facial bones are also spaced widely enough apart to allow some enlargement of the adenoids without their becoming a problem. Subtle but still abnormal bone development of the back and legs causes many people to endure backaches and foot trouble for years. Underdeveloped pelvic bones in little girls eventually necessitate Caesarian sections at the birth of their own children. Thus advantages of excellent skeletal development are far-reaching indeed.

Correcting abnormalities. If the diet is made adequate, faulty bone structure can be improved as long as growth continues, but the superior development possible had no dietary insult occurred will probably never be achieved. For instance, I have seen only one child whose crowded, crooked teeth fell into alignment without orthodontia as the dental arch developed following dietary improvement. In general, the younger the child is, and the faster his growth, the more his skeletal development will improve, provided his diet completely fulfills all of his body requirements. The emphasis should be on preventing faulty bone structure, not on correcting it.

Years ago a mother asked my advice on feeding six-month-old twin girls whose facial bones were already severely deformed; she had failed to give them any form of vitamin D regularly. One baby's bones were so narrow and elongated that the parents already called her "little bunny face." The other baby's face had failed to develop outward, and she had a flat, nose-punched-in look, causing the parents to fear that she was not intelligent. To each child this mother gave 2 teaspoons of cod-liver oil daily with raw certified milk; and she made other dietary improvements. The facial bones of both these girls changed markedly, and they are now relatively attractive young women, though by no means as beautiful as they could have been.

I have seen dozens of narrow, pinched faces and hollow chests of young children become somewhat well formed after two or three years on adequate diets. Beyond the age of seven, however, usually so much damage has been done if vitamin D has not been given regularly that, while some improvement may occur, real correction is almost impossible. If you observe adolescent youngsters carefully, you will see that very few have facial structure which is not malformed in one way or another.

Still, much can be done with relatively little effort. I shall never forget being asked into a home where two children, 12 and 14 years old, had been in and out of hospitals all their lives because of severe allergies. To my amazement, both were beautiful children with excellent bone structure. Though the mother had not heard of pantothenic acid, she had given these children cod-liver oil almost daily since early babyhood. "That's one thing I didn't let them miss," she told me.

It is important to realize that the best of bone structure will not remain excellent unless the diet stays adequate. Recently a friend dropped in with her teen-age daughter.

The girl had been beautiful as a baby, relatively attractive as a ten-year-old, but now is heartbreakingly ugly, her facial bones severely deformed. Her mother, I am sure, has no idea that this child's appearance has any relation to her diet. This type of tragedy happens so often with babies who have been nursed.

Unfortunately, teeth which have been well mineralized can also quickly become honeycombed if the diet is inadequate, but more calcium, magnesium, and phosphorus can again be laid down in both the dentine and the enamel, and faulty structure thus somewhat rectified.

Abnormalities can never be prevented until one is aware of their existence. Furthermore, skeletal abnormalities can be prevented during only a short period. Beauty must be established by the end of the first year or never at all.

Things to remember. If you wish your child to be attractive, see that his diet is adequate in protein, calcium, magnesium, vitamin C, and particularly vitamin D from the first day of birth on (ch. 19). Remember that an inadequate formula during the first three months, if not improved, can cause ugliness for a lifetime; that children under the age of ten or 12 years do not absorb vitamin D well from capsules; that twins, triplets, premies, children who already have rickets, and rapidly growing youngsters whose parents are large-boned need far more vitamin D than do other children; that breast-fed babies do develop rickets and their bone structure often degenerates after weaning; that the natural vitamin D from fish-liver oils is not toxic; that oils should not be added to formulas because they adhere to the bottle; that vitamin D increases the absorption of calcium and magnesium at every age, hence should be continued throughout all years of growth; that vitamin D and calcium can be absorbed only in the presence of fat; that skim milk should not be given to a child, even an obese one, during any year of growth; that it is dangerous to increase oil in the diet, even cod-liver oil, without giving vitamin E; and that the water-soluble vitamin-D drops can be toxic and should be used cautiously.

The mother who helps her children reach their genetic potential gives them the satisfaction of lifelong attractiveness and herself the satisfaction of a job well done.

CHAPTER TWENTY-SIX

Abnormalities During Early Babyhood

When a woman has adhered to an excellent diet during pregnancy and nurses her baby or gives him a nutritionally adequate formula, few problems ever arise. Not all babies, however, are so fortunate. The views in these next two chapters should be most helpful to the mother and her physician in dealing with these abnormalities.

Colic. There appear to be many causes of colic, a catchall term used to explain almost any loud, persistent crying. For example, the nervous tension of a frightened, inexperienced mother can upset an infant enough to interfere with digestion; his undigested food supports the growth of intestinal bacteria, which produce large amounts of gas, causing distention and gas pain, or colic. The colic, in turn, increases the mother's tension; the baby's digestion becomes worse; and the colic continues. Furthermore, a lack of any of the B vitamins interferes with digestion, thus increasing the amount of gas formed. Pain labeled as colic can also be caused by intestinal cramping, which results from a deficiency of magnesium, calcium, or vitamin B_6. Research indicates, however, that a loss of potassium from the body may be largely responsible for colic. The resulting lack of potassium causes paralysis of the small intestine, which brings the digestion and absorption of food to an immediate halt; intestinal bacteria therefore have a heyday in forming gas.

When women have been under unusual stress during pregnancy, their babies' adrenal glands are often so unhealthy that they cannot produce the hormones (aldosterone) necessary to prevent the loss of potassium in the urine. The mother may have suffered from low blood sugar (p. 52) or allergies, or she may have stayed on an inadequate reducing diet. In any case, she allowed her own adrenal glands and those of her infant to become exhausted.

In a study of 653 sick babies, every infant with colic had low blood potassium. "Improvement was dramatic," and the colic disappeared immediately, when physicians gave 500 to 1,000 milligrams of potassium chloride intravenously or 1,000 to 2,000 milligrams by mouth. These doctors found that most babies needed 3,000 milligrams of potassium chloride (⅔ teaspoon) before colic was corrected. They suggested that potassium be given to prevent colic, especially during diarrhea, when much of this nutrient is lost in the feces. Potassium is also lost when too much salt (sodium) is allowed a baby, and/or when pantothenic acid is so deficient that the adrenals become exhausted.

Most mothers instinctively want to feed a baby who is crying violently. Because a colicky baby is not digesting his food completely, giving more food usually makes him worse. If he is breast-fed, let him have frequent but very small feedings, and try to keep him happy with a pacifier. Hand-express your milk to keep the supply from decreasing if you need to. Improve your own diet and try to get more sleep, so that you can feel relaxed. Avoid salt, but increase your intake of potassium and pantothenic acid. Study the Tables of Food Composition (pp. 308-343) and select foods richest in potassium. Also salt your foods generously with a potassium-chloride salt substitute, sold at most drugstores and health-food stores. You might add ⅛ to ¼ teaspoon of this salt substitute to drinking water if you wish to give it to your baby. Some salt substitutes are combined with herbs or other seasoning, but the amounts are so small that I would ignore them.

If your baby is on a formula, a crushed 10-milligram tablet of pantothenic acid and a little potassium-chloride salt substitute can be added to each bottle. Give him small but frequent feedings until his digestion has improved. In case his formula contains any kind of sugar except lactose, discontinue it immediately. Because either is largely digested during the culturing process, consider giving a formula of yogurt or acidophilus milk (p. 162), or at least add to his formula enough yogurt or acidophilus culture to supply valuable intestinal bacteria and destroy the gas-producing ones. For a few days, a formula could be prepared of salt-free or low-sodium milk, available at drugstores. If your baby is on solids, allow no food to which salt has been added. To improve digestion, ¼ teaspoon of digestive enzymes available in liquid, powder, or granular form, can be added to the formula immediately before it is given. These measures are largely temporary and can be discontinued when the colic is over.

One young mother whose baby suffered from colic for months told me how desperate she felt. "I suckled my infant son to give him food, warmth, and love," she told me, "but I inflicted pain on him instead." At first she had been afraid "to experiment" with her baby, but when she had finally given him yeast and liquid enzymes in his drinking water, he had improved immediately. The yeast supplied both the potassium and pantothenic acid he needed. Frequently colic disappears the very day pantothenic acid is given and/or potassium is increased.

The most important fact to know about colic is that it rarely occurs unless the mother has been on such an inadequate diet during pregnancy that her baby's adrenal glands are exhausted. Unless the health of these glands is improved, you can expect years of problems associated with faulty adrenal functions, which include allergies, low blood sugar, and almost every other abnormality known to man.

"Cradle cap." Physicians usually consider the crusty yellow scabs appearing on the scalps of newborn infants to be seborrheic dermatitis; if the baby has thick hair, it may be seen only as dandruff. Seborrheic dermatitis has been produced in volunteers deficient in vitamin B_6. "Cradle cap" probably occurs only when an infant's requirement for vitamin B_6 is unusually high—some need four to 20 times more than others—or when his mother has been deficient in this vitamin during pregnancy. Most babies seem to need 3 to 10 milligrams of vitamin B_6 daily.

Breast milk contains only a fraction as much vitamin B_6 as does cows' milk, but if the mother takes this vitamin, the amount in her milk increases. Without magnesium, however, vitamin B_6 is not well absorbed or utilized. When a baby is nursed, "cradle cap" usually clears up quickly if the mother adds yeast, liver, 250 milligrams of magnesium oxide, and perhaps 25 milligrams of vitamin B_6 to her daily diet.

"Cradle cap" of an artificially fed baby generally clears up if yeast, yogurt or acidophilus, and magnesium in a formula are increased and 10 milligrams of vitamin B_6 daily are added.

Vitamin B_6 is not always well absorbed. However, when an ointment containing vitamin B_6 has been applied to the skin, seborrheic dermatitis has cleared up quickly. Such a soothing ointment can be obtained from health-food stores. If it is not available, a few tablets of vitamin B_6 can be pulverized, stirred into a vegetable oil or cold cream, and a little applied frequently to a baby's scalp.

Diaper rash. Infants whose mothers were unhealthy during pregnancy sometimes have diaper rash before they are a week old, especially when allowed sugar water in the nursery or a formula high in any sugar except lactose. Babies given formulas of skim milk or of soy milk, thus lacking linoleic acid, have also developed severe diaper rash; this rash has cleared up as soon as the essential fatty acids were allowed them. Body oils, secreted onto the skin, protect it from irritants, but such oils are formed only from unsaturated fatty acids; they cannot be synthesized unless these acids are supplied in the diet. Breast milk and whole cows' milk both contain linoleic acid. Though diaper rash is rarely a problem when the diet supplies all essential nutrients, in a study where babies were kept on soy-milk or skim-milk formulas, all had severe diaper rash, but the infants given soy milk were by far the worst.

Infants are born deficient in the vitamins which dissolve in fat—vitamins A, D, E, and K—because fat cannot readily cross the placenta. A lack of vitamins A and E causes them to be particularly subject to diaper rash as well as to many other abnormalities. If such a rash is severe, vitamin A alone, available from halibut-liver oil, might be increased for three or four days to 15,000 units daily and vitamin E to perhaps 300 units. Vitamin A, D, and E drops, supplied by natural d-alpha tocopherol combined with fish-liver oil, clear the skin more rapidly than does water-soluble vitamin A, provided vitamin E is included. Vitamin A in oil, the contents of a vitamin-E capsule, or vitamin-E ointment can be applied directly to the inflamed area. All appear to be soothing and often bring improvement in an hour.

Some mothers slather an infant's skin with mineral oil, which is sold as "fine baby oil." Such oil can pass through the skin, circulate in the blood, and absorb vitamins A, D, E, and K before being excreted in the feces. Because the body is thus robbed of much-needed vitamins, under no circumstances should mineral oil be used, though vegetable oils may advantageously be applied to protect the skin.

Thrush. A severe form of diaper rash, or thrush, is common among babies kept on formulas high in the sugars which do not support the growth of favorable intestinal bacteria. Thrush is a disease caused by the fungus *Candida albicans* or *Monilia albicans;* it apparently occurs any time intestinal bacteria fail to snythesize B vitamins. Oral antibiotics, by destroying these bacteria, actually produce deficiencies of these vitamins and are now responsible for many cases of thrush. In the absence of the B vitamins, the fungus grows in the intestines and spreads to the skin surrounding the anus. It can also cause itching and severe inflammation in the rectum and vagina.

Even more common is a thrush infection in the mouth, causing it to be red and sore and to show white spots on the tongue, gums, and inside of the cheeks. If a baby is being nursed, this infection may spread to the mother's nipples, making them persistently sore and preventing them from healing for perhaps weeks. Thrush has cleared up in two weeks or less when 100 milligrams of the B vitamin niacin amide have been given each day to infants. If a nursing mother will take daily fresh liver, yeast, and a supplement of all B vitamins, her baby will usually recover rapidly and her nipples, if sore, will heal. For the formula-fed baby, yeast, yogurt, and/or acidophilus should be increased immediately; and niacin amide tablets furnishing 100 to 300 milligrams per day of the vitamin can be crushed and put into the formula, or ½ teaspoon of syrup supplying all the B vitamins added to each bottle.

Impetigo. This highly contagious skin infection, which often occurs during the first week of life, clears up almost immediately when 10,000 units of vitamin A from fish-liver oil and 100 units or more of vitamin E are given the infant. Rapid relief occurs if you cover the infected area with halibut-liver oil or oil drops containing vitamins A, D, and E. Vitamin-E ointment or vitamin E squeezed directly from a capsule can also be used.

Prickly heat. When babies who have endured prickly heat for weeks have been given 1,000 milligrams or more of vitamin C daily, recovery has been rapid. This abnormality appears to be brought on by histamine, formed as a reaction to the stress of heat; and vitamin C has a marked antihistamine action.

If prickly heat is a problem, a nursing mother should increase her own vitamin-C intake immediately. For other babies, this vitamin can be added to each bottle (p. 176) or given directly from a spoon (p. 192).

A friend claims that vitamin B_6 pulverized, dissolved in water, and applied to an itching skin will bring almost immediate relief. Unfortunately, I have been unable to try this remedy. If she is right, it might be well to use it on any baby with severe prickly heat.

Eczemas, or skin rashes. When babies are kept on formulas of skim milk or defatted soy milk or ones containing only coconut butter, a saturated fat, the lack of linoleic acid causes them to develop eczemas, or skin rashes, during their first month. This type of eczema clears up rapidly when the baby is allowed breast milk, cows' or goats' milk, or vegetable oil. Quick temporary relief occurs when some vegetable oil, such as safflower, is applied to the skin.

A lack of any one of several of the B vitamins can cause eczema, common in babies given formulas high in any sugar except lactose, necessary to support the growth of intestinal bacteria which produce these vitamins. One reason eczema occurs so frequently when soy milk is given is that it contains no lactose, and this sugar is rarely added to soy-milk formulas. If the offending sugar is discontinued and lactose is given instead, this type of skin rash clears up quickly, provided yeast and yogurt and/or acidophilus are added to a baby's formula or to the diet of a nursing mother.

Vomiting. Nausea and vomiting have been repeatedly produced in human volunteers lacking vitamin B_6; and this vitamin has successfully relieved vomiting resulting from a wide variety of causes (p. 45–46). Vomiting in babies, however, is apparently considered to be so "normal" that I find no mention of it in medical journals. Anything which causes an infant to swallow large amounts of air can, of course, result in vomiting (p. 185).

Babies are often born deficient in vitamin B_6. This vitamin is rarely added to a formula and is not rich in breast milk; a lack of it undoubtedly causes vomiting in some cases. If vomiting is persistent, I would suggest adding 10 milligrams of vitamin B_6 daily to a formula; and that a nursing mother temporarily take 25 milligrams of the vitamin after each meal, especially if she is taking oral contraceptives.

Pyloric stenosis. This abnormality, which often occurs in very young infants, is characterized by violent vomiting and is said to be caused by a narrowing in the passage between the stomach and small intestine. It is customarily relieved by surgery. Some doctors, however, believe this illness is caused by deficient formulas loaded with refined sugar.

A pediatrician once asked me to go into a home to feed an infant with pyloric stenosis. My instructions were to give the baby a cooked cereal which was so extremely thick that it presumably could not be thrown up. If the baby did vomit it, I was to give still more cereal as soon as he would take it. I found a worried mother, sick with exhaustion, and a four-month-old baby who had been vomiting for days and was miserable and fretful but hungry. The cereal, the most refined one on the market, was already prepared to specifications. The baby eagerly ate a dish of cereal, but within minutes it was splattered over the mother, myself, the dining-room table, chairs, rug, and everything within an eight-foot radius. After much cleaning, I again fed the cereal as instructed, and with exactly the same results. Then I suggested that we try giving the baby every hour a tablespoon of uncooked wheat germ softened in milk. This small amount was miraculously retained, and the vomiting completely stopped.

Though I have worked with only a few other babies with pyloric stenosis whose severe vomiting stopped when B vitamins were given them, I suspect that if 30 milligrams of vitamin B_6, ¼ teaspoon of magnesium oxide, and a concentrate of all the B vitamins were allowed for at least three days, surgery might sometimes be prevented.

Constitpation. Only when stools are hard, dry, and difficult to pass does constipation exist. Regardless of how infrequent the evacuation, if the feces are still soft, an infant is not constipated. Often healthy breast-fed babies pass only one large stool every five to seven days, a normal condition which need cause no worry. It is usually the bottle-fed infant given a heat-damaged formula high in refined sugar who develops constipation.

A baby whose stools are hard is almost always deficient in B vitamins and/or magnesium. All foods rich in the B vitamins are laxative, and care must be taken in giving magnesium to keep it from causing diarrhea. When constipation is a problem, therefore, these steps should be taken immediately: any sugar except milk sugar (lactose) should be withdrawn from the formula; and yeast, lactose, magnesium, and yogurt and/or acidophilus culture should be added (p. 162). If these foods are already being given, the amounts should be increased.

Enemas introduce water which is far from sterile into the body; laxatives frequently damage the delicate intestinal walls; and mineral oil robs the infant of vitamins A, D, E, and K. For these reasons, such substances should never be given a baby.

Diarrhea. A healthy, normal infant may have a soft bowel movement in each diaper. Diarrhea exists only when the stools are liquid, or completely unformed. As we have seen, diarrhea occurs when skim-milk or soy-milk formulas are given, or when the diet lacks linoleic acid.

Infections of the intestinal tract and antibiotics also frequently cause diarrhea, which in both cases can be remedied by giving generous amounts of yogurt and/or acidophilus.

Diarrhea can be produced by sugar-loaded formulas, especially in premature infants who lack the enzymes to digest sugars. Though any added sugar except lactose should be immediately discontinued, if the formula is made adequate, enzyme production soon becomes normal.

For almost 50 years it has been known that a lack of the B vitamin niacin amide, sometimes called vitamin B_3, can cause diarrhea. I shall never forget young parents who brought their tiny weeks-old daughter to see me. She had been hospitalized because of diarrhea until that afternoon; and the parents, who were moving, were then taking her to a second hospital. As we visited, I gave the mother a 100-milligram tablet of niacin amide, which she placed on the baby's tongue. It fell out repeatedly, but was gradually dissolved. Another tablet was given immediately, and the vitamin was added temporarily to the formula. By the following day the diarrhea had cleared up, and the second hospital was never reached. Despite the many causes of diarrhea in infants, I have rarely seen one whose stools were not well formed soon after all B vitamins were allowed.

Niacin amide, or vitamin B_3, can be formed in the body from the amino acid tryptophane provided vitamin B_6 is adequate and more protein is eaten then is needed to build body tissues. Infants deficient in vitamin B_6 cannot form niacin amide from tryptophane. Apparently for this reason, diarrhea has been produced in volunteers merely by withholding vitamin B_6 from their diets. Numerous studies have shown that most babies are deficient in vitamin B_6 and niacin amide, especially infants whose birth weight was small. Protein and, therefore, tryptophane have also been found to be low in the diets of babies with diarrhea. Since mothers so often crowd out good milk protein with canned baby foods, it is not surprising that thousands of babies deficient in both B vitamins and protein are hospitalized annually with diarrhea.

The more malnourished a baby is, the greater tendency he has toward diarrhea. Conversely, persistent diarrhea can quickly produce severe malnutrition in a healthy infant by causing excessive losses in the feces of almost all nutrients. For example, diarrhea often causes such severe deficiencies of magnesium that tremors, muscle spasms, and even convulsions occur. Despite the fact that magnesium is laxative, if given daily during diarrheas, it improves the appetite, speeds healing, increases the hours of sleep, and helps the baby to be more relaxed. Similarly, a loss of potassium during diarrhea can induce colic and heart damage; therefore salt, which increases the urinary loss of potassium, should be temporarily avoided.

Studies have shown that even when diarrhea is severe, the larger the amounts of wholesome food eaten, the more nutrients absorbed and the sooner the diarrhea subsides. Because fat slows up digestion, adding a tablespoon of vegetable oil or 2 or 3 tablespoons of light cream to a day's formula often helps. A formula made entirely of whole-milk yogurt or ordinary yogurt or buttermilk with ½ cup of light cream added per quart has been especially successful in stopping diarrhea. Perhaps 3 pulverized tablets of niacin amide, 100 milligrams each, could be added to a day's formula, but make sure the word *amide* appears on the label; and the quantity of yeast added and/or B-vitamin supplement used should be increased. The formula could be made still more nutritious by the addition of 1 or 2 egg yolks and perhaps ¼ cup of powdered whole milk. Allow your baby to take as much of the formula as he wishes.

An older child already eating solids should be encouraged to fill up on a formula high in B vitamins and protein. His diet, however, need not be smooth. Some physicians believe that steamed carrots and mashed bananas have special merit in relieving diarrhea. Give them if you wish.

If your breast-fed baby should have diarrhea, try to improve your own nutrition, and nurse him more frequently. If you take 100 milligrams or more of niacin *amide* at each meal, the amount in your milk will increase. Above all else, do not wean him because of the diarrhea. He needs more food now, not less, and the diarrhea is upsetting enough without the added stress of being weaned abruptly. Often a breast-fed infant's loose stools result from nothing more serious than the mother's having eaten heartily of fresh fruit.

Prevention is possible. If an expectant mother would read this entire book before her baby is born and obtain an adequate diet for herself and her infant, every abnormality mentioned in this chapter might easily be prevented.

CHAPTER TWENTY-SEVEN

Infections Can Be Avoided

So much is known about how to prevent infections that any mother who conscientiously applies this knowledge in feeding her baby will probably be rewarded with a he's-never-been-sick-a-day record.

Literally thousands of studies made the world over indicate that an infection simply cannot occur unless malnutrition precedes it. Furthermore, the nutritional state at the time the infection sets in determines the seriousness and duration of the illness and even whether a child survives. Yet despite a vast knowledge about prevention, a tremendous number of physicians—and probably all pediatricians—are said to give half their time to treating infections.

Unseen guardian angels. If your baby's diet has been adequate, when bacteria or viruses gain entrance to his body, specialized lymph tissues produce protein substances known as antibodies, or gamma globulins. Each antibody "matches" a particular attacking virus or bacteria, as a key does a lock. These antibodies are his guardian angels, which render bacteria and viruses harmless and prevent an infection from occurring.

Once specific antibodies have been synthesized, your baby's lymph cells can reproduce them any time they are needed, even years later, provided his diet supplies the nutrients required to make them. If he is exposed to mumps, for example, he remains healthy because antibodies which destroy the mumps virus are quickly produced. Whenever he is exposed to mumps in the future, he can be protected by identical antibodies, provided his diet remains adequate. Thousands of varieties of antibodies can be similarly produced to destroy the countless kinds of bacteria and viruses to which your child will be exposed.

A breast-fed baby becomes resistant to infections in proportion to the kind and number of antibodies his mother has built up and therefore secretes in her milk. The bottle-fed baby, lacking this advantage, has markedly lower resistance by the time he is ten days old.

Making antibody production possible. Before antibodies can be produced, vitamins A, C, B_1, B_2, B_6, and B_{12}, biotin, niacin amide, pantothenic acid, and folic acid must be supplied. The diet, however, must be particularly adequate in protein. If too little protein is obtained or if a single essential amino acid is undersupplied, antibody production can decrease 75 per cent or cease entirely. Infections are especially prevalent when too little animal protein from milk, eggs, meat, and cheese is eaten. A world-wide study of 51 nations showed that the most appalling number of infections occur where vegetarian diets are followed and less than 20 grams of animal protein are obtained daily. Conversely, when infants' diets were supplemented with powdered milk before and after weaning, infections were reduced 56 per cent; and head circumferences increased, indicating better brain development.

Though breast-fed infants rarely have infections, their diets often become so inadequate after they are weaned that they get one infection after another. Without essential nutrients antibodies cannot be reproduced, even after the lymph glands have the pattern for making them. In fact, a decrease in antibody production is one of the first signs of a faulty diet. If the diet is markedly improved, however, the synthesis of antibodies can increase a hundredfold within hours. Recovery is on its way.

Other defenses. Whenever an infection threatens, a healthy body produces still other guardian angels, such as white blood cells and lymph cells, which can destroy or render harmless bacteria and viruses, and a substance known as interferon, which keeps viruses from multiplying. As in the case of antibodies, however a deficiency of protein, a single essential amino acid, or vitamins A, B_1, B_6, C, or folic acid prevents the synthesis of these protecting substances, whereas yeast, liver, wheat germ, egg yolk, meat, and milk are particularly effective in increasing their production.

The anti-infective vitamin A. A treatise on infections published by the World Health Organization states that vitamin-A deficiencies accompany almost every type of infection or infectious disease, and it cites 50 scientific studies upon which this statement is based. Though adequate vitamin A helps to prevent infections in many ways, one is by protecting the mucous membranes. These membranes covering all inside openings of the body, whether lungs, sinuses, stomach, or any other, are similar to that lining the mouth. When vitamin A is generously supplied to the cells (and the diet is otherwise adequate), al mucous membranes are continuously washed with a thin mucus which contains an enzyme, lysozyme, capable o instantly destroying viruses and bacteria. This mucus is kept in constant motion by tiny hairs, or cilia, which sweep it back and forth at the rate of 250 times a minute, making it impossible for any viruses or bacteria to survive.

Neither bacteria nor viruses can harm the body unless they can first enter the tissues. For example, viruses can multiply only by using the reproductive mechanism inside of individual body cells. When the diet is adequate, especially in vitamin A, the walls of all body cells are so strong that they cannot be penetrated. If vitamin A is undersupplied, however, the cells of the mucous membrane become dry and horny; they can no longer secrete mucus, grow hair-like cilia, or produce bacteria-digesting enzymes. To add insult to injury, they actually hold bacteria to their surfaces, simultaneously serving as a continuous food supply. Animals deficient in vitamin A die so quickly from infections that these changes in the cell walls are difficult to study, but if they are kept in a germ-free environment, no infections can occur and cell-wall degeneration can be observed. Even when infections induced by a vitamin-A deficiency have caused animals to be near death, however, giving the vitamin allows them to survive. Similarly, if cod-liver oil or another good source of vitamin A is added to a child's diet, within five to seven days the enzyme lysozyme increases markedly and normalcy is largely restored.

Tiny babies are subject to a wide variety of infections because they are born deficient in vitamin A; and any vitamin A given them is quickly destroyed without vitamin E (p. 189). Furthermore, unless human diets contain at least 7 per cent fat, vitamins A, D, E, and K cannot be absorbed into the blood. Without this quantity of fat, vitamin-A deficiencies continue to exist even though the diet is high in carotene, the yellow color in fruits and vegetables which changes into vitamin A. If a fat containing no vitamin A whatsoever is added to such a diet, however, absorption of the vitamin formed from carotene is so improved that the amount of both vitamin A and carotene in the blood quickly increases and all vitamin-A-deficiency symptoms disappear. I purposely stress this point because 40 per cent of all babies now suffer from vitamin-A deficiencies, and the number is rapidly increasing.

Pediatricians are producing vitamin-A deficiencies in babies by giving skim-milk formulas which prevent the absorption of vitamin A; by allowing no vitamin E which could protect vitamin A from destruction; and by giving so many solids that breast milk or whole milk, when used, is crowded out and the vitamin-A intake reduced. Again and again I have found that when a vitamin-A deficiency, thus produced, shows itself by a stuffy nose, a quick diagnosis of allergy is given, and all milk is taken out of the baby's diet. Immediately the intake of excellent animal protein is reduced, and the number of infections increases. Though the often repeated statement that milk is mucus-forming has no scientific basis, it has caused tremendous harm in that mothers and pediatricians alike seem to believe it.

The perfect antibiotic. Vitamin C helps to prevent infection in a variety of ways. It keeps connective tissue so strong that bacteria and viruses have little chance of entering the body. It increases the production of adrenal hormones, which are vitally important in fighting infections. It aids in the syntheses of cell proteins and antibodies.

Dr. Fred R. Klenner, chief of staff at the Memorial Hospital in Reidsville, North Carolina, has been a pioneer in successfully treating infections with large amounts of vitamin C. Seriously ill babies who have been brought to him have usually been given a wide variety of antibiotics; often they have been so ill they were not expected to live; many were unconscious, and one had already been given up as dead. If the babies were too seriously ill to swallow, Dr. Klenner gave them 1,000 to 3,000 milligrams (1 to 3 grams) of vitamin C by injection every two to four hours round the clock, the amount increasing with the seriousness of the illness. Usually they regained consciousness and were able to eat within a few hours after first receiving vitamin C. A vitamin-C solution (p. 176) was then given by mouth, and the amount slowly decreased as recovery occurred. Dr. Klenner has found that during infections almost no vitamin C was lost in the urine, even when tremendous amounts were given, though it has long been known that excess vitamin C is quickly excreted.

When 10,000 milligrams of vitamin C were taken daily by 245 children suffering from hepatitis, their recovery was rapid.

Physicians who have given babies suffering from infections large amounts of vitamin C have repeatedly declared it to be the perfect antibiotic; it causes no allergic reactions and no toxicity. This vitamin inhibits the growth of bacteria and renders harmless both viruses and bacterial toxins. In fact, when given in huge amounts, vitamin C appears to be deadly to all types of viruses and bacteria; and enormous quantities have been found to be as effective in hastening the recovery from such serious infections as encephalitis, meningitis, or virus pneumonia as from a simple ear or sinus infection or a common cold.

Vitamin C should always be given at the very onset of an infection, or the first moment symptoms are observed. The requirement is reduced if bioflavonoids, supplied by fresh orange juice liquefied with the pulp and white part of the rind, are given with it. The vitamin is more effective at the onset of an illness and far less is needed than later on. Physicians who have done research on massive amounts of vitamin C have stressed repeatedly that one should err by allowing too much rather than too little, and that there is no point in injections of vitamin C if a baby can swallow. Giving large, frequent amounts of the vitamin with the first symptom often stops the infection immediately, and no illness develops.

Much larger quantities are needed to produce results after an infection has gotten a foothold. For example, the beautiful little daughter of a friend developed encephalitis following measles; because their physician had been unable to get her into a hospital, she lay unconscious at home. Her mother and I tried to give her vitamin-C solution, but so much of it spilled that we froze it to a soft sherbet and continuously put tiny bits between her slightly parted lips. During the afternoon we gave her approximately 50,000 milligrams (50 grams) of vitamin C. She was then taken to the hospital and put in a ward with three other children, all of whom had been unconscious ten days or longer. Our little girl was alert the following morning, ate a hearty breakfast, and was discharged after a battery of tests could reveal no brain damage.

Increasing the amount of vitamin C rapidly after a baby is already ill can cause diarrhea, which does not occur if the vitamin is increased slowly or given by injection. For this very reason, I gave my children rather generous amounts of vitamin C—usually 250 to 500 milligrams—in each bottle while they were well. Then if an infection threatened, they could take large amounts of vitamin C without danger of diarrhea. If the stools do become liquid, vitamin C should be decreased but not stopped.

Mothers frequently ask me why every doctor does not give injections of vitamin C if it is so superior to antibiotics. One physician states that the tremendous value of massive amounts of vitamin C is "being ignored because of the monetary losses that would be inflicted on pharmaceutical manufacturers, professional journals, and doctors themselves." For example, after one physician found that 4,000 to 5,000 milligrams of vitamin C daily were effective in clearing up such cold symptoms as excessive nasal discharge, sneezing, coughing, sore throats, hoarseness, and headaches in most patients, he submitted his observations to 11 different medical journals but was rejected by each. One editor told him frankly that it would be harmful to the journal to publish a useful treatment for the common cold.

Many pediatricians, therefore, have not read the research showing the value of massive amounts of vitamin C. Few know that several pharmaceutical firms do market vitamin-C solutions for injections; and fewer still actually give such injections. Every year I receive hundreds of letters asking me for names of doctors who give vitamin-C injections; I am sorry, but I do not know such physicians. If a mother keeps vitamin-C solution (p. 192) on hand and gives it generously as long as an infant can swallow, injections are rarely needed. In case babies are allowed to develop infections, however, the amount of money spent on medical bills would usually pay for a ten-year supply of vitamin C.

The importance of vitamin B_6 and pantothenic acid. When animals are put on diets deficient in pantothenic acid, infections occur so quickly that half of them die before any sign of a deficiency can be observed. Even a slight lack of pantothenic acid causes antibody production to be severely reduced. Similarly, when human volunteers have remained on diets lacking pantothenic acid alone or both pantothenic acid and vitamin B_6, few or no antibodies could be produced. Starting with the very first week, all the volunteers had continuous colds and respiratory infections which persisted for weeks, or until after the experiment was over.

A healthy baby can be given yeast as a source of B vitamins, whereas a sick one, unaccustomed to the flavor, will probably refuse it. Supplements containing the vitamins needed in larger amounts during stress, usually labeled antistress tablets, are available, however, each furnishing 50 to 100 milligrams of pantothenic acid, 5 or 10 milligrams of vitamin B_6, and some vitamin C and other B vitamins. Such preparations generally lack cholin and inositol and are only for temporary use.

A vitamin-C solution to be used at the onset or during illnesses can be modified by liquefying together 50 antistress tablets, each supplying 5 milligrams of vitamin B_6 and 100 milligrams of pantothenic acid, and 100 tablets of vitamin C, 500 milligrams each, in 1 cup of warm water. Each ½ teaspoon of this solution would then supply 500, 100, and 5 milligrams respectively of vitamins C, pantothenic acid, and B_6. It can be sweetened with honey to taste, and kept refrigerated. During an illness, 1 or 2 teaspoons might be given every two or three hours round the clock, always with a high-protein formula (p. 184) if the baby is bottle-fed. Since 10,000 milligrams of pantothenic acid have been taken daily by volunteers with no signs of toxicity, this vitamin is quite safe for your baby. Usually swollen tonsils and/or adenoids decrease rapidly in size when pantothenic acid and vitamins B_6 and C are given several times daily with an otherwise adequate diet. Unfortunately, the vitamin drops prepared especially for infants usually contain less than a milligram of vitamin B_6 and no pantothenic acid, and lack many other B vitamins essential to prevent infections (p. 247).

When an infection occurs. During an illness, a baby's requirements for almost every nutrient skyrocket. Pounds of body tissue can be destroyed during an acute infection; and the more serious the illness, the greater is the need for dietary protein and the more quickly a protein deficiency can occur. Simultaneously, a baby's digestion and absorption of all nutrients decrease while losses in perspiration, urine, and feces soar. The body's stores of vitamin A are used up with shocking speed regardless of the type of bacteria or viruses involved; and the amounts of vitamin A and C in the blood drop to dangerously low levels.

A baby's lack of appetite causes his diet to become drastically inadequate at the very time his nutritional needs are greatest. A worried mother may offer him only juice or broth with toast or perhaps try to tempt him with foods having no nutritive value. If he is hospitalized, he usually fares even worse, yet certainly this is no time for nonsense feeding. The malnutrition which originally invited his infection becomes increasingly more severe. There quickly develop deficiencies of protein, of vitamins A, C, E, and all the B vitamins, and of many minerals; thus one infection usually follows another.

When a mother realizes that a seemingly insignificant runny nose can quickly develop into a series of increasingly serious infections, she can see the importance of going into action the minute the first symptom appears. For example, a baby who has the sniffles, is irritable, and eats little may develop measles; since his resistance is already low, he can become quite ill. His measles may be followed by encephalitis, meningitis, or a serious kidney infection, any one of which could have been prevented had his nutrition been kept adequate.

During an infection, regardless of its name, degree of seriousness, or where located, the diet should be limited almost entirely to foods rich in protein. Breast milk, fortified formula (p. 184), pep-up (p. 101), eggnog sweetened with honey, or egg yolks, powdered milk, vanilla, light cream, and honey beaten into fresh orange juice are all excellent. Fruit juices may be given instead of water, but under no circumstances should soft drinks be permitted.

The amounts of all body requirements, however, are markedly increased during every acute infection. When any nutrient cannot be supplied by food, supplements should be heavily relied upon. Because the nutritional needs are practically identical during a boil, ear abscess, tonsillitis, pneumonia, rheumatic fever, nephritis, flu, bronchitis, hepatitis, or any other infection, the diet is essentially the same in all cases.

A tremendous amount of research indicates that during every infection vitamin A should be immediately increased, but the amount needed is not known. The more vitamin E given, however, the less vitamin A is destroyed, and the lower the vitamin-A requirement (p. 189). If a mother is aware that vitamin A can be toxic but that vitamins C and E prevent such toxicity, she can safely increase vitamin A to 25,000 units daily. This amount should be allowed for no more than a few days or only while the infection lasts, perhaps two weeks at the most. Vitamin C and at least 100 to 200 units of vitamin E should be given with the vitamin A.

In India, where vitamin-A deficiencies still cause thousands of children to become blind, 2,500 youngsters were given by mouth a single dose of 300,000 units of vitamin A; they were observed for four years, during which no sign of toxicity occurred. I am not for a moment suggesting that this quantity be given to any American child, but the study indicates that 25,000 units or more of vitamin A, given cautiously for a few days when the supply is rapidly used up, would be safe if accompanied by vitamins C and E.

The childhood diseases. Mothers often consider measles, mumps, and chicken pox to be unimportant, yet to some children they bring lifelong tragedy. Measles and mumps particularly cause a tremendous destruction of body protein and of vitamins A, C, and E. An undersupply of vitamin C causes nosebleeds, hemorrhages, and even scurvy to accompany such infections. Frequently pneumonia, encephalitis, or some other serious infection follows almost immediately. Often childhood diseases cause permanent damage to the eyes, ears, kidneys, and, in children under age three, the brain. For these reasons, if a child of mine were ill with measles, for example, I would give, in addition to huge amounts of vitamin C, at least 25,000 units of natural vitamin A and 500 units of vitamin E daily, though for no longer than a week.

It is almost unbelievable how light these childhood diseases can be when no malnutrition exists. Both of my children had all of them for approximately half a day. Usually unmistakable symptoms were discovered in the morning. Immediately I gave fortified milk with large amounts of vitamins A and E; and they took generous quantities of vitamin C and pantothenic acid every hour. By noon all signs of fever were gone, and the children were impossible to keep in bed. No meals were missed; no real sickness occurred.

Vaccinations and inoculations. The purpose of vaccinations is to force the production of antibodies which can protect a child from each disease against which he has been immunized. If rats are deficient in vitamin B_6 or pantothenic acid at the time they are vaccinated, however, no antibodies can be formed. Similarly, when humans deficient in pantothenic acid were given a variety of immunization shots, they could produce few antibodies. Volunteers deficient in both B_6 and pantothenic acid and given diphtheria toxin synthesized almost no antibodies whatsoever. A lack of many nutrients can thus decrease or even nullify the effectiveness of various vaccines.

The more adequate the diet, the more value gained from inoculations; therefore, for several days before you take your baby for immunization, try to keep his diet excellent. Large amounts of vitamin C protect him from the "resultant injury" caused by various toxins. If rats are given diphtheria toxin when deficient in protein, vitamin A, or any of the B vitamins, the inoculation causes them to be sick indeed in comparison with animals on adequate diets. In all probability, children react in the same manner.

Live bacteria, used in vaccines against smallpox and polio, cause mild infections and increase the need for all nutrients. Not long ago an outstanding orthopedic specialist said to me, "When polio shots became popular, I thought I had seen the last of that disease. Instead, I see dozens more children with one leg slightly shorter, some group of muscles mildly damaged, a back twisted, or some other abnormality due, I believe, to the infection caused by live polio virus."

He was not arguing against polio vaccinations. Certainly mild harm is preferable to being crippled for a lifetime. This amount of damage, however, is unnecessary. It was found when polio was common that no paralysis, or damage to nerve and muscles, occurred if protein and B vitamins were adequate; and that vitamin C both increased the production of polio antibodies and caused the infection to be mild.

When live polio vaccine was given orally to several hundred babies under three months of age, an unidentified substance in breast milk rendered the virus innocuous without interfering with antibody production; cows' milk contained none of this protective material. Such studies indicate that a bottle-fed infant particularly should be given more protein, vitamin C, and other nutrients at the time he receives polio vaccine.

Facing facts. For 50 years scientists have produced infections at will in every type of experimental animal. In every case it has been equally easy to prevent these infections. It is time, therefore, to face the fact that infections are likewise being produced in children. The methods by which they are being produced are obvious to anyone who has studied nutrition.

It is probably true that each person does his best and none does less than his best. It is certainly true that one's best can usually be improved.

CHAPTER TWENTY-EIGHT

Forewarned Is Forearmed

One problem which disturbs me is the number of mothers who give drugs to their babies, apparently believing them to be harmless. Let us, therefore, consider the mildest of these frequently used drugs.

Should aspirin be given? Aspirin accidentally kills approximately 150 children each year. Some of these deaths and many thousands of cases of aspirin poisoning are caused by well-meaning mothers giving this drug for colds, fevers, teething, or even to get a baby to sleep. Though more than $10 million is spent annually on "baby" aspirin alone, the American Medical Association has repeatedly warned physicians that aspirin is far from being a harmless drug. Aspirin can upset your child's digestion, interfere with innumerable enzymes, decrease the clotting time of blood, cause urinary losses of many nutrients, induce serious allergies, increase all nutritional requirements, and even damage chromosomes. Aspirin destroys vitamin C so completely that it often causes nosebleeds and internal hemorrhaging. One study showed that 2 aspirin tablets increased bleeding time from six minutes to two hours.

Certainly a wise mother avoids giving her children aspirin whenever possible. If it must be used, 500 milligrams of vitamin C should be given with each aspirin tablet to decrease its toxicity.

Avoid asking your doctor for drugs. The so-called "miracle drugs" have received such glowing publicity that uninformed mothers not infrequently demand them for their children. Let your pediatrician use his own judgment about giving drugs; he is expertly trained in this field.

Many drugs, including penicillin and several other antibiotics, can produce such a severe vitamin-B_6 deficiency as to cause convulsions and other serious abnormalities. I have been shocked at the number of mothers consulting me whose mere babies—18 months old or less—have developed diabetes after being given antibiotics. A variety of drugs, including several antibiotics, often cause serious liver damage. Unsuspected yet severe allergies to drugs also exist; many children have died within minutes of anaphylactic shock after being given injections of antibiotics. Other drugs, including several tranquilizers prepared for babies, have been found to cause chromosome damage.

By destroying valuable intestinal bacteria, oral antibiotics can induce multiple B-vitamin deficiences and a vitamin-K deficiency, resulting in severe hemorrhaging. Furthermore, oral antibiotics often bring about detrimental changes in the intestinal walls, which sometimes become ulcerated; they interfere with the absorption of nutrients; and they can induce thrush (p. 245) and severe itching around the genitalia. Some interfere with hearing; others cause the teeth to become permanently yellow. Moreover, if antibiotics are given frequently, bacteria may build up such a resistance to them that these drugs are no longer effective when perhaps desperately needed to save a life.

All drugs are toxic; all are potential poisons; and it is for this reason that they are sold only on prescription. The more adequate the diet, however, the less harmful is any drug and the more effective it becomes. Some drugs are 20 times more effective when taken with an adequate diet. Vitamin C, which acts as a detoxifying agent in the body, can prevent much damage from a drug, increase its value, and shorten the time it is needed. The more drugs taken, however, the more vitamin C required; and a single dose of a drug can destroy 300 to 800 milligrams of the vitamin. When drugs must be used, therefore, I recommend that 500 milligrams of vitamin C be given with each dose, expecting that this quantity will be destroyed. Giving an infant receiving an antibiotic perhaps 10 milligrams of vitamin B_6 simultaneously might prevent tragedy. If oral antibiotics are used, yogurt or acidophilus milk or culture should always be given daily with the drug and for three weeks or more afterward to replace valuable intestinal bacterial.

If the nutrition is varied to meet the needs imposed by illness, drugs are rarely needed.

After permanent damage. There are numerous causes of illness aside from faulty nutrition; and often irreparable damage has already been done which adequate nutrition might have prevented but cannot correct. Examples are mental retardation, inborn errors of metabolism, and muscular dystrophy.

The nutrition of a child suffering from an irreparable abnormality should be kept more than adequate even though his condition cannot be corrected. Often such children are allowed to develop multiple nutritional deficiencies, and their symptoms are erroneously assumed to be part of their illnesses. Mongoloid and mentally retarded children, for example, have been helped by being given daily 30 units or more of vitamin E; and Dr. Henry Turkel, a pediatrician in Detroit, Michigan, has reported excellent progress with 200 mongoloids by a treatment which includes improved nutrition. Incidentally, mongoloids have been found to be twice as prevalent in areas where fluoridated water is used, and mottled teeth are common among them. Incurable diseases, however, are beyond the scope of this book.

Teething. No one seems to have investigated the effect of nutrition on teething, though I am sure some babies are far more miserable during this period than others. Calcium, magnesium, and vitamin E all decrease sensitivity to pain; hence, giving generous amounts of these nutrients might make a child more comfortable. Certainly there is stress involved, causing all nutrients, especially vitamin C and pantothenic acid, to be needed in generous amounts. Because one hears so much about teething, I was surprised that neither of my children seemed to suffer discomfort at this time. I have since become convinced that their good diet was far more helpful than the aspirin usually given; and I suspect that teething could be made more pleasant for most mothers and babies.

The hyperactive child. Hyperactivity and inability to relax are characteristic of an excessive phosphorus intake (p. 173) combined with deficiencies of magnesium, calcium, and vitamins B_6 and D, essential for calcium absorption. This problem is becoming progressively more serious because physicians, by recommending skim milk, are preventing the absorption of calcium and vitamin D. The hyperactive children for whom I have planned diets, and there have been many of them, had been eating mostly sweets, soft drinks, and white-flour products. A deficiency of magnesium is often the major cause of the problem, and supplying this nutrient may bring a marked change in a single week. For example, I recently planned a diet for a three-year-old child who for most of her life had been so hyperactive that it was nerve-racking to be near her. Though delightfully energetic, she is now as relaxed as a sack of cotton and completely comfortable to be around.

Any active child has higher requirements for all nutrients than does a lethargic one. For this reason, a diet for a hyperactive youngster should be more than adequate in every respect. I recommend that such a child be given daily 1 gram of calcium (p. 92) in addition to a quart of whole milk; 2 teaspoons of cod-liver oil with 200 units of vitamin E; as much yeast, liver, and wheat germ as he can take happily; 10 milligrams or more of vitamin B_6; a balanced B-complex syrup or tablets for older children; and ¼ teaspoon of magnesium oxide in milk at breakfast and at supper if tolerated without diarrhea.

Some physicians state that most hyperactivity is caused by adrenal exhaustion. In this case the adrenals must be restored to health (p. 109) before relaxation can be expected. Whatever the cause, however, nutrition certainly has more to offer than the usual tranquilizers.

Burns. A mother told me recently about her baby getting burned. "His bottle was in boiling water," she explained. "The handle of the pan caught on my pocket, and the water spilled right on the baby's face." Such a tragedy need no longer inflict excruciating pain or leave lifelong scars.

Drs. Wilfrid and Evan Shute, of London, Ontario, Canada, have colored pictures of dozens of patients so horribly burned that, when I saw them at a nutrition convention years ago, many persons had to leave the room. Yet by putting vitamin E or vitamin-E ointment directly on these burns, pain had disappeared within minutes; and when the vitamin was taken by mouth as well as being applied to the surface, normal tissue soon covered the area and no disfiguring scars formed. I myself have seen extremely severe burns heal without a scar when vitamin-E capsules have been pierced with a needle and the contents squeezed over the burned surface several times daily.

Dr. Fred Klenner (p. 253) has found that vitamin C can be equally effective. He recommends making a solution by liquefying or dissolving 50 tablets of vitamin C, 500 milligrams each, in 1 quart of water. This solution can be sprayed on the burned surface or used to moisten cloths which are placed on the burn. He tells me the pain disappears so rapidly that persons with extremely severe burns do not need pain-killing drugs, and that if large amounts of vitamin C are simultaneously taken by mouth, such burns heal rapidly without scarring and no skin grafts are necessary.

A friend to whom I mentioned Dr. Klenner's work on burns swears that it saved her life. While coming home from a ski trip, a large thermos of boiling coffee spilled on her lap. She declares that the pain was unbearable but that within minutes after vitamin-C solution was applied, all inflammation disappeared.

An ointment containing the B vitamin PABA has been used successfully both for preventing sunburn and for taking the pain out of severe sunburn. It also appears to take the pain out of any other type of burn.

A severely burned child may become so dehydrated that he must be hospitalized. In my opinion, however, the medical treatment of burns is at present cruel, medieval, and causes unbelievable pain, often followed by years of skin transplants, needless suffering and expense, and lifelong scarring, most of which could easily be prevented.

I personally feel that vitamin-C solution should be kept on hand as long as there are small children in the family; and an inexpensive spray bottle could be purchased and stored for just such an emergency. Then if a child were severely burned, a mother could apply vitamins C and/or E immediately while her husband was calling the doctor. If it were my severely burned child and a physician refused to allow vitamins C and/or E, I would quickly change to another pediatrician.

Scarring. Much research shows that vitamin E can prevent excessive scarring (keloid formation), which causes itching, drawing pain as it is being formed and later contracts and shrinks tissues, often leaving lifelong disfigurement. If the vitamin is given daily, healing can occur without the scarring which so often complicates disease, accident, or surgery. The esthetic value of preventing the scars from auto accidents and burns is obvious. Scarring, however, can cause a wide variety of serious problems.

For example, a couple's infant son had already undergone surgery several times when I first met them about ten years ago. The boy's ureter opened at the base of his penis instead of the end, a common congenital abnormality. Again and again a canal had been formed surgically, only to become blocked within two or three weeks by scar tissue. Until the surgery could again be performed, this child would scream with pain each time he had to urinate. When this little boy was given 600 units of vitamin E daily before and after the next surgery, healing was rapid, and there has been no problem since. I am told that babies with this deformity sometimes undergo surgery 20 or 30 times without a unit of vitamin E given them.

Most illnesses leave damaging scars which should be prevented. Scarring from ear infections usually causes loss of hearing. During rheumatic fever, scarring of heart valves results in heart murmurs of varying seriousness. Because unseen scars can interfere with body function, the vitamin-E intake should be increased during all illnesses, before and after surgery, and following accidents.

When damaging scars have already formed, they can sometimes be replaced by normal connective tissue, provided the diet is completely adequate. For instance, I occasionally see parents whose 18-month-old son drank lye. As healing occurred, the contraction of scar tissue had almost closed his esophagus, and he could be fed only by stomach tube. For months he had endured a weekly mechanical stretching, an ordeal so painful that hospitalization was required. At this point they started giving the baby, with their physician's blessing, 3,000 units of vitamin E daily, a quantity probably much larger than needed. They have continued this huge amount now for about two years. The mechanical stretching is no longer necessary, and the child can now swallow foods which are not liquefied. His parents tell me that similarly scarred children brought to the same clinic they attend but not receiving vitamin E are making no progress and must still undergo the excruciatingly painful stretching treatments.

Since Dr. Klenner has found that vitamin C can prevent the scars caused by burns, it may be wise to spray vitamin-C solution (p. 264) on accident wounds which could leave disfiguring scars.

Umbilical hernia. The muscles of animals deficient in vitamin E often split lengthwise, allowing hernias to occur. Since all babies are born deficient in vitamin E, a lack of this nutrient may play a role in causing umbilical hernias, so common among infants. Such hernias often do heal spontaneously.

Perhaps giving 500 units of vitamin E daily for a week or more to an infant with umbilical hernia might speed recovery. Certainly this vitamin should be given before surgery is resorted to. Because vitamin E absorbs well through the skin, it could also be applied over the hernia.

Congenital heart disease. When rats are kept on diets low in vitamin E during pregnancy, their young are born with congenital heart abnormalities and retarded development of the heart muscles not unlike those found in humans. Similar structural defects of infants' hearts sometimes allow the oxygen-rich blood from the lungs to mix with darker venous blood, causing the child to look blue. In a study of 411 children who had been blue babies, 40 per cent were found to be mentally subnormal, presumably because the heart condition prevented sufficient oxygen from reaching the brain. Since vitamin E decreases the need for oxygen, it has been particularly helpful to children with this type of heart abnormality, often making expected surgery unnecessary.

Through the years I have planned diets for many children with congenital heart malformation for whom surgery was said to be essential. Each child was given at least 100 units of vitamin E daily throughout the growth period. None has required surgery and several have developed into excellent athletes.

I was amazed to read recently that a deposition of calcium in the heart muscles can occur so rapidly after heart surgery that it often causes death within a few days. Abnormal deposits of calcium are laid down in soft tissues, especially at a point of injury, whenever the diet is deficient in magnesium or vitamin E. Certainly generous amounts of these nutrients should be given before surgery is undertaken.

Crossed eyes. Some cases of crossed eyes in babies have been corrected when 3,000 units of vitamin E were given daily. Though I have never observed it, parents have told me of their children's crossed eyes becoming normal after the vitamin was given. As little as 100 units of vitamin E daily have sometimes helped nearsightedness, which can occasionally be corrected by adequate intakes of calcium, magnesium, and vitamin D.

Muscle abnormalities in babies. Muscle cells both fail to develop normally and break down easily when vitamin E is undersupplied. A deficiency of this vitamin is often seen in a newborn's inability to hold his head erect; in any baby's pot belly, which is as out of place as on an athlete; in a delay in sitting, crawling, and/or walking; and in the abominable posture of most children. When 300 units of vitamin E or more have been given daily to children with flabby muscles, a marked change can often be seen in a few weeks.

Most muscles become weak when there is an undersupply of protein, vitamin B_1, pantothenic acid and vitamin B_6 together, cholin, or potassium. A baby's pot belly or any child's poor muscle tone, shown by faulty posture, advertises to one and all that his diet is inadequate.

When my children were babies, I felt quite proud of their high chests and flat little stomachs. Later I was repeatedly asked what kinds of exercises I gave the children to cause them to be so erect. Never once did I say to either, "Stand up straight." Muscles kept strong by an adequate diet maintain an attractive posture without effort.

When poisons are swallowed. Every mother probably thinks it will never happen to her baby, yet each year a half-million American children swallow some type of poison, such as pesticides, cough medicine (naphthalin), lye, moth repellents, iron tablets, or drugs, of which aspirin is the most common. Even after you have raced frantically to an emergency hospital and your baby's stomach has been pumped, he may be ill for weeks.

Several steps can be taken to decrease his suffering. For example, since vitamin C serves as a detoxifying agent, it can help to nullify the toxicity of a wide variety of poisons. Good results have been obtained when 1,000 milligrams of this vitamin have been given as soon after the accident as possible, preferably by injection, and the same quantity repeated every three or four hours. Rats fed poison attempt to protect themselves by producing 50 to 75 times more vitamin C than they normally synthesize. It would appear, therefore, that the more poison obtained, the more frequently vitamin C should be given and the larger the quantity.

If the diet is inadequate, poisons can cause serious liver damage. The liver serves as a detoxifying organ by producing a variety of substances which combine with poisons and cause them to be excreted in the feces. Poisons do far less harm and are more completely detoxified when the diet is particularly high in vitamins A, C, and E, cholin, magnesium, and protein, especially the amino acids cysteine and methionine, which are rich in eggs. Yeast is more valuable than most foods in preventing liver damage. Except for vitamin C, however, vitamin E is by far the most important nutrient in helping the body to cope with poisons.

Because poisoning is so dangerous, the entire antistress program should be followed for a few days when at all possible (p. 110). As many as 2 or 3 eggs or egg yolks should be added daily to the fortified milk; and at least 300 units of vitamin E could be given after each meal.

Lead poisoning. Thousands of children become blind or mentally retarded or are otherwise harmed each year from chewing lead-containing paint from toys, cribs, or window sills. An acquaintance who had just restored an early New England home told me, "Generations of children had been brought up in that house, yet there was not one tooth mark on a single window sill." She thought that giving too many soft foods might be responsible for children's chewing of hard objects which only incidentally are painted.

When the diet is inadequate, especially in calcium, almost every variety of farm animal will chew painted surfaces. If the diet of these animals is improved, such chewing stops. I suspect the same holds true with children; certainly the greatest number of lead-poisoning cases come from the slums, where diets are atrocious. If a child is found to be chewing a painted surface, my advice would be to improve his diet as quickly as possible.

Whether or not such damage can be prevented depends on how recently lead was ingested and the quantity swallowed. Large amounts of vitamin C, especially if given immediately, have produced excellent results. Generous quantities of this vitamin should be continued for months, together with a diet high in all nutrients shown to aid the liver in the detoxification process (p. 268).

Bites, stings, and scratches. More children are said to die each year because of allergies to bee stings than from being bitten by poison snakes. Perhaps such deaths could be prevented if vitamin C were given quickly enough. For example, by injecting 1,000 milligrams or more of this vitamin, Dr. Fred Klenner has treated successfully scorpion stings and such dangerous bites as those of black-widow spiders, rattlesnakes, and water moccasins. I can find nothing specifically dealing with bee stings. Since vitamin C absorbs quickly, giving a huge amount by mouth immediately could probably be almost as effective as injections. Certainly it should be used for any type of bite, sting, and scratch, or for poison oak or poison ivy.

Last summer when I was stung by bees, I discovered that vitamin E, squeezed directly from a capsule onto the stings, caused all pain to disappear immediately. A friend claims that 25 milligrams of vitamin B_6, if crushed, dissolved in a little water, and applied to the skin, will stop various types of itching and the discomfort of insect bites.

I ran across an article on 152 cases of cat-scratch disease, apparently due to a virus but not helped by antibiotics. It caused such swelling of pus-filled lymph glands that some were removed. It seems to me that any child scratched by a cat should therefore be given the antistress program (p. 110) the minute inflammation appears.

Enlarged tonsils and adenoids. In a healthy individual, one of the first reactions to stress is that lymph glands shrink in size. Adrenal hormones cause much of their protein content to be changed into sugar and fat to supply energy. It is only when the adrenals are exhausted that any lymph tissue, such as tonsils, adenoids, or lymph glands under the chin and behind the ears, can become enlarged. A child with infected, inflamed, or enlarged tonsils and/or adenoids usually craves sweets and has low blood sugar, infections, and allergies, all typical of adrenal exhaustion.

Although such a child probably needs vitamin C and pantothenic acid more than any other nutrients, before surgery is considered the antistress program (p. 110), high in all body requirements, should be followed for months. Enlarged tonsils are only an index of over-all malnutrition.

Autistic children. Little is known concerning autistic children, who suffer from infantile schizophrenia and perhaps brain damage. Many such children have been born prematurely to mothers suffering from adrenal exhaustion; hence they have been unhealthy since birth. Moreover, they appear to have extremely high nutritional requirements.

Dr. Bernard Rimland, author of *Infantile Autism*, has studied 200 autistic children of three years of age and older. The diets of these youngsters were first supplemented daily with moderate amounts of B vitamins and 2,000 milligrams of vitamin C. Two weeks later 150 milligrams of vitamin B_6 and 2,000 milligrams of niacin amide were added to their daily intake; and later still 200 milligrams of pantothenic acid were given each day. After three months these supplements were stopped. Changes in behavior both during supplementation and afterward were carefully observed and recorded.

Computerized findings showed that 45.3 per cent of these children had markedly improved; another 41 per cent showed slight improvement. Appetites increased, and the children became more sociable, especially after vitamin C was given them. Vitamin B_6 so improved the speech of youngsters having difficulties in talking that Dr. Rimland thinks this vitamin might help stutterers. Some children reacted negatively to such a large quantity of pantothenic acid or niacin amide. After vitamin B_6 was given, several children started wetting the bed who formerly had not done so, possibly because it increased the need for magnesium. Adding magnesium to the diets of children lacking it often stops bed-wetting.

Such results are encouraging, especially when one realizes that the children's diets were probably still inadequate in protein, linoleic acid, vitamin A, D, and E, calcium, magnesium, and a wide variety of other minerals. Autistic children are notoriously difficult to feed. If they could be given a high-protein diet free from all refined foods and supplemented with each mineral and vitamin, improvement would probably exceed expectations.

Nutrition is a safeguard. When parents have a thorough knowledge of nutrition, they can safeguard their children's health. For these parents, problems which often cause unbelievable anguish to the uninformed simply do not exist. Because they are forewarned, they are also forearmed.

CHAPTER TWENTY-NINE

Allergies?
Why Keep Them?

A week or so after I brought our to-be-adopted daughter, Barbara, home from the hospital—then less than a day old—I took her to a pediatrician. When I mentioned that her biological mother had suffered continuously from severe allergies from her own babyhood until the end of pregnancy, he remarked with considerable alarm, "This baby's not adoptable."

Naturally, I bristled like a porcupine. "Allergies don't worry me much," I replied defensively, convinced then as now that when the nutrition is adequate, allergies rarely occur.

"You'll have nothing but trouble," he predicted.

To my knowledge, Barbara has never had an allergy to food. She used to spend the summers with my sister on an Indiana farm, however, and the separation each year caused mild attacks of emotionally induced asthma. Repeatedly all her symptoms disappeared as if by magic after an hour's work with a children's psychotherapist. Though she was for a time extremely proud of having asthma, which made her one with her peers, she was never ill enough to miss sleep or school.

Medical journals state that allergies rarely appear before the age of three months, which in my opinion is ample time to prevent them.

Those pesky foreign substances. Allergies are caused by foreign substances getting into the blood by way of injections or through the skin or the mucous membranes of the nose, lungs, and intestinal tract. Even vitamin injections have caused severe allergies. Often the offending substances, known as allergens, are incompletely digested proteins, though they may be drugs, pollens, animal dandruffs, or dozens of other materials. What appear to be food allergies are sometimes caused by residues from the 328,000 tons of pesticides used annually or by the 3,000 chemicals allowed as food additives. The same allergens which make many persons desperately ill, however, are found in the blood of healthy persons.

Keep those tissues healthy. Allergens are absolutely harmless unless they get into the blood; and they are far too large to pass through healthy tissue. Just as vitamin A helps to keep viruses and bacteria from entering the cells (p. 188), so does it, if protected by vitamin E, form barriers against allergens. Similarly, vitamin C and linoleic acid, by helping to maintain strong connective tissue and strong cell walls, prevent openings through which allergens can pass. High-quality protein is equally essential to keeping allergens out of the tissues. For example, if dye is injected into animals deficient in protein, it quickly penetrates the tissues, whereas it cannot even enter the cells when the protein intake is high. Similarly, allergens cannot get past the body's fortifications if the diet is completely adequate; thus allergies are prevented or, if they already exist, they are corrected.

Many physicians allow allergies to be widespread by ignoring vitamin E, and therefore permitting vitamin A and linoleic acid to be destroyed by oxygen; and by recommending skim-milk formulas which prevent vitamins A, D, E, and K from absorbing. If as much as 7 per cent fat is added to the diet, these vitamins can reach the blood. As it is, however, cell walls are allowed to become fragile; openings are made and allergens are invited to enter.

That wonderful pantothenic acid. A lack of the B vitamin pantothenic acid is a major cause of allergies. For example, experimental allergies are produced by infections of foreign substances such as undigested egg-white protein; the resulting allergic reaction is fatal to animals deficient in pantothenic acid, whereas such injections have no effect if the vitamin is allowed. Furthermore, pantothenic acid is the only single nutrient which can prevent serious allergic reactions; and allergies have cleared up when the diet is unchanged except that pantothenic acid has been added.

Physicians have treated all types of allergies successfully with cortisone, whether eczema, hives, hay fever, asthma, or any other. Similarly, egg-white injections cause no experimental allergies if cortisone is given simultaneously. Yet these injections are fatal to animals receiving no cortisone or whose adrenal glands have been removed so that no cortisone can be produced. Such facts indicate that allergies could not exist if a person's own adrenal glands synthesized a sufficient amount of cortisone. The adrenals, however, are unable to produce cortisone unless supplied with pantothenic acid. A deficiency of pantothenic acid also causes a certain type of blood cell, the eosinophils, to increase abnormally, a condition which occurs during all allergies.

Malnourished children known to be deficient in cortisone and other adrenal hormones are subject to allergies. Moreover, urine analysis showed that volunteers on diets lacking pantothenic acid produced few adrenal hormones; and they suffered continuously from "colds," which could easily have been experimentally produced allergies. The adrenal glands of animals deficient in pantothenic acid hemorrhage and become filled with scars; and one wonders what is happening to the adrenals of babies whom pediatricians keep on diets lacking pantothenic acid. The adrenal glands of adults are so damaged by a lack of pantothenic acid that recovery may take weeks after the vitamin has been added to the diet.

Vitamin drops prepared for babies usually contain no pantothenic acid, though it has been known for over 30 years that this vitamin is essential to the health of every cell in the body. Because of rapid growth, the requirements of infants and children are especially high, and some require four to ten times more than others. Many pediatricians do not even allow most babies to get pantothenic acid from food. It is largely destroyed by heat when milk is quickly pasteurized at a relatively low temperature; canned milk, canned baby foods, and most baby formulas are submitted to long heating at such high temperatures that all pantothenic acid is destroyed. Other nutrients essential before cortisone can be produced (p. 109) are also often lacking from infants' diets.

The amount of pantothenic acid needed by a particular child is not know. Every type of stress, such as colic, teething, infections, eczema, and an inadequate diet, however, increases the pantothenic-acid requirement; and it is invariably following such stress that allergies first appear. Since yeast is rich in pantothenic acid, I have never heard of a baby developing allergies if receiving a teaspoon of yeast per bottle; and allergies are almost unknown among breast-fed infants, whose pantothenic acid is synthesized by intestinal bacterial.

It has been suggested that 10 to 20 milligrams of pantothenic acid daily be given to infants and children, the larger quantity during periods of stress. This vitamin, however, is not toxic even in huge amounts. For weeks volunteers have taken 10,000 milligrams (10 grams) daily with excellent results. Certainly there should be no fear in supplying any infant with adequate pantothenic acid.

Vitamin C can help. Less pantothenic acid is needed when the diet is high in vitamin C; the vitamin C increases the growth of valuable intestinal bacteria, which then produce more of all the B vitamins. Furthermore, vitamin C increases the rate of cortisone production, improves its utilization, and delays its destruction; and as a detoxifying agent, it can render harmless whatever allergens have reached the blood, provided enough of the vitamin is supplied. Children suffering from allergies invariably have low blood vitamin C, especially when receiving medication; and conversely, individuals deficient in this vitamin are particularly susceptible to allergies.

The quantity of vitamin C needed to relieve allergic symptoms varies with the amount of allergen reaching the blood and the severity of the reaction. I usually suggest giving children 250 to 500 milligrams of vitamin C every two or three hours. Dr. Fred Klenner would say to give as much vitamin C as possible without causing diarrhea. Giving as little as 250 milligrams of vitamin C daily has sometimes produced good results.

Those food allergies. During normal digestion, all carbohydrates are broken down and absorbed into the blood as simple sugars, all proteins as amino acids, and all fats as fatty acids and glycerine. None of these substances can cause allergies. It is only when products formed from partly digested foods get into the blood and act as foreign irritants that food allergies can occur. These substances would probably be completely digested if sufficient digestive juices and enzymes were present; and since they occur in large particles, they should never be allowed to reach the blood. If the diet is deficient in B vitamins, however, the production of digestive juices and enzymes is so decreased that digestion becomes incomplete; yet when liver, rich in B vitamins, has been given daily, allergies have disappeared.

Babies often lack the enzymes necessary to digest foods properly; therefore allergies are produced by giving solids before the age of six months, especially to malnourished children or ones whose birth was premature. A study of 1,377 children showed that the earlier solids were introduced, the larger were the number who developed allergies without a family history of the illness and the longer these allergies persisted, often for years. There seems to be general agreement that nursing babies and introducing solids late are the best ways of preventing allergies.

Fatigue, illness, and emotional upsets can cause digestion to be so incomplete that food allergies occur. Because of such influences, allergies vary from week to week, and a child who usually has an allergic reaction from eating a certain food may remain in excellent health after eating the same food at another time. For this reason, skin tests have little value.

When a child suffers from food allergies, the first emphasis must be on improving digestion.

Careful with antihistamines. There is an amino acid, histidine, which is freed when protein is digested. If digestion is below par and no yogurt or acidophilus has been allowed, however, putrefactive bacteria in the intestine, thriving on incompletely digested protein, change much needed histidine into a highly toxic allergen known as histamine; this allergen then passes into the blood. Quantities of such histamine are found in the blood of allergic persons.

During any type of stress, body proteins are broken down, and again histamine is formed, a process which causes emotionally induced allergies and ones resulting from extreme heat, cold, or overexposure to sun. Asthma, for example, can be caused by a mother scolding or punishing a child and making him feel rejected. In a healthy person, as the blood passes through the liver, histamine is immediately detoxified by an enzyme, histaminase. The liver, however, cannot produce this enzyme if the diet is low in three nutrients rarely given to babies, cholin, magnesium, and vitamin E. Furthermore, the very drugs used in treating babies for allergies and infections, antihistamines and antibiotics, often cause liver damage. The damaged liver, in turn, unable to produce histaminase, allows allergies to develop.

The antihistamine drugs are so highly toxic that they often cause stomach bleeding and ulcers as well as liver damage, frequently making allergies worse. Vitamin C, on the other hand, if given in large enough amounts, acts as a detoxifying agent and renders histamine harmless without itself ever becoming toxic, though it is rapidly destroyed in the process.

Drugs often cause allergies. Many drugs cause allergies; even aspirin, given by well-meaning mothers, often causes death from allergic shock. If drugs are given with vitamin C or if the vitamin is taken two hours before a drug is administered, however, such allergies can usually be prevented. The amount of vitamin C needed varies with the toxicity of the drug; 100 milligrams are too little, but 500 milligrams have usually been adequate. Since vitamin C makes drugs more effective, when planning a nutrition program I suggest that 500 milligrams of vitamin C be given with each dose of any drug a physician prescribes.

Value of dietary improvement. Children subject to allergies usually live on starchy foods, soft drinks, and sweets, causing their diets to be deficient in all nutrients except calories. Though allergies frequently disappear when nutrition is improved, of thousands of articles on this subject in medical journals, I find only one where the effect of an adequate diet was studied. A mere 32 children suffering from allergic eczema or bronchial asthma were given generous amounts of protein, adequate unsaturated fatty acids. and supplements furnishing daily a few B vitamins, 600 milligrams of vitamin C, and 20,000, 800, and 32 units each of vitamins A, D, and E. They were also asked to forgo refined foods. At the end of the first month most of the children were well. Within two months, all were well.

It is obvious to anyone aware of nutrition that almost a third of all bottle-fed babies suffer from allergies only because most formulas are disgracefully inadequate.

Allergies made permanent. Countless pediatricians advise taking allergic babies off cows' milk; and if solids have been introduced, one after another is removed from the diet. Since the nutrition becomes progressively worse, the allergies continue. Thus a large percentage of adults suffering from hay fever, asthma, and other allergies developed eczema as infants and settled for permanent allergies.

Fortunately, some pediatricians recognize that allergies are brought on by stress and can disappear as soon as the stress is over. Physicians urging that milk not be withdrawn from the diet reported that of 24 children who developed allergies to milk during illnesses, not one child was allergic to it after recovery. Conversely, other doctors found that of 50 babies supposedly allergic to milk, none improved after milk was taken away. Even when milk allergies have been severe, adequately fed babies can tolerate milk later. Often symptoms are misdiagnosed as milk allergies when they are actually mild infections, especially when skim milk has been given and vitamins A and E thus were prevented from being absorbed.

"They run in the family." One physician, in criticizing the inadequacy of "damaging formulas," has pointed out that 40 per cent of babies given them are doomed to allergies when one parent has a history of the disease and 75 per cent if both parents have been afflicted. Though in some families allergies have been traced back for four generations, this hereditary factor may be only an unusually high genetic requirement for pantothenic acid, vitamin C, or some other nutrient. Unfortunately, families often stay on faulty diets for generation after generation.

If the diet during pregnancy is excellent, a woman who has suffered from allergies need not have a child who develops them. Conversely, if a mother's adrenals are exhausted (p. 110) and her diet fails to correct this condition, her baby will be born with adrenal glands incapable of producing cortisone and other hormones and will, therefore, be subject to allergies.

When allergies appear to run in the family, a baby should be given larger than usual quantities of all nutrients known to protect the body from these abnormalities.

A child who craves sweets. Allergies occur when the diet fails to supply the nutrients needed to prevent the adrenals from becoming so exhausted that cortisone can no longer be produced. Simultaneously, the synthesis of other adrenal hormones decreases or ceases, which causes the blood sugar to drop below normal, resulting in fatigue, irritability, nervousness, and a craving for sweets.

Allergies are most severe when the blood sugar is lowest. For example, during the night, the blood sugar drops because no food has been eaten for several hours; thus asthma attacks usually occur in the early morning. If the drop in blood sugar is prevented by a late high-protein feeding, asthma usually does not occur. When the diet is kept so adequate that the health of the adrenals is restored, allergies and low blood sugar alike are corrected.

Exhausted adrenals. Healthy adrenal glands produce still another hormone, aldosterone, which prevents too much sodium from being lost in the urine. When these glands are exhausted, however, so much sodium is lost that abnormal amounts of water pass into the cells, causing them to swell and become inflamed; thus such symptoms as a stuffy nose, postnasal drip, watery eyes and swollen tissues are characteristic of allergies. Inflammation is often relieved almost immediately if a child suffering from allergies or an infection will drink warm water in which is dissolved ½ teaspoon each of salt and baking soda. Small frequent meals high in protein must be eaten, however, to prevent the blood sodium from dropping again.

Though a child suffering from an allergic inflammation should be allowed salty foods temporarily, as soon as the allergy attack subsides, his salt intake should be restricted. If he is given ACTH or cortisone, which cause excessive amounts of sodium to be held in the body, no salt whatsoever should be allowed in his diet.

Immediate action. The diet should be improved the moment the first symptoms of an allergy appear. Increase pantothenic acid and vitamin C immediately by making a solution of the two (p. 256) and giving ½ teaspoon in each bottle or with each meal or, if the allergy is severe, every two or three hours; 500 milligrams of vitamin C every hour have relieved severe hay fever and asthma, though 1,500 milligrams daily were also found to be effective. Regardless of how large the amount of vitamin C given, if bruises and/or nosebleeds occur, the amount of vitamin C is still inadequate.

Vitamins A and E should be increased to strengthen cell barriers; and because vitamin E decreases the need for oxygen, it is especially valuable for the child suffering from asthma. Yogurt, yogurt tablets, or acidophilus culture should be given two or three times daily to crowd out histamine-forming intestinal bacteria. If milk is the offending allergen, ½ teaspoon of liquid or powdered digestive enzymes, available at drugstores and some health-food stores, can be mixed with every bottle of milk to insure more complete digestion.

It is important to keep the diet high in protein, calcium, magnesium, and the B vitamins and adequate in all other nutrients. To prevent a drop in blood sugar, small meals, each supplying 10 grams or more of protein, should be given every two or three hours, and no refined foods in any form should be allowed. Eating such a meal before bed or, for a time, during the night is essential for an asthmatic child.

If the foregoing suggestions are followed, there is rarely need to remove a health-building food from the diet, even when allergies are severe. Children are so rarely allergic to goats' milk that it may be substituted temporarily for cows' milk if a parent wishes to do so. Yogurt and acidophilus milk, if made of whole milk, are both well tolerated by allergic babies. Commercial soy milk and soy-milk formulas should certainly be avoided (p. 164), and even soy milk prepared at home should be used only as a last resort. When an infant of perhaps four months is apparently allergic to one formula after another, the best solution is usually to put him to the breast (p. 151); with frequent nursing, milk flow can be established in a few days.

The most common allergy is to wheat, but one whole grain can be substituted for another without nutritional harm. Hard-boiled eggs are well tolerated and should be given to children allergic to raw or soft-cooked ones. The more youngsters who are allergic to chocolate, the better.

The price paid. As in the case of infections, research indicates that allergies can exist only when the diet is woefully inadequate; and that by giving babies oversalted, low-protein foods deficient in pantothenic acid, vitamin E, and many other nutrients, allergies have been produced and are still being produced in millions upon millions of American children. The amount of suffering and expense thus caused can scarcely be imagined.

CHAPTER THIRTY

Delay Can Bring Tragedy

A gap often exists, sometimes of 50 years, between research findings and their practical application. Yet failure to improve a diet quickly enough can result in irreparable damage, lifelong suffering, and perhaps early death. Until the time when thorough courses of nutrition are taught in medical schools and physicians see that diets are adequate, unless the mother takes this responsibility no one does.

The sicker the child, the greater becomes his need for health and therefore for adequate nutrition. Usually, the more ill the child, the worse is his diet and the more panicky his mother. She sometimes forgets that supplements sustain life and are not harmful drugs; and that a sick child needs them in addition to the best of foods and all the help her physician can give. Nutrition is a means of building health, never an attempt to practice medicine.

Most of the diseases dealt with in this chapter have been discussed in my book *Let's Get Well.** Information pertaining to infants or small children suffering from such illnesses is summarized here, largely for parents who do not have the earlier book.

Convulsions. One of the most frequent causes of convulsions, which can occur the first week of life, is the loss of calcium in the urine induced by a "phosphorus overload" (p. 173). Similar seizures can be brought on by a lack of vitamin B_6 and/or magnesium. Without a blood analysis, neither vitamin-B_6-induced convulsions nor low-magnesium tetany can be distinguished from the convulsions caused by calcium loss. A simple urine test showing the amount of xanthurenic acid (p. 46) reveals a vitamin-B_6 deficiency, but this test is not used by most practicing physicians. All too often pediatricians and parents alike assume that convulsions are caused by brain damage, and anticonvulsive drugs are given for years without the slightest attempt to improve the diet.

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*New York: Harcourt, Brace & World, Inc., 1965.

I find reports of babies whose seizures stopped immediately when 10 milligrams of vitamin B_6 were allowed, though they had been continuously kept on anticonvulsive drugs, which had not controlled their convulsions. One baby girl had been cruelly kept on drugs, yet still suffered from convulsions for 13 months before vitamin B_6 was permitted. A lack of vitamin B_6 alone can cause mental retardation; yet electroencephalograms show that brain function becomes normal within minutes after this vitamin is given. The anticonvulsive drugs destroy folic acid, essential to the brain and the synthesis of DNA and RNA. It is not surprising, therefore, that a child who both is deficient in vitamin B_6 and has long been drugged is no longer intelligent. The cause is usually said to be birth injury, but I suspect it is more often people injury.

Convulsions occurred in several adults and one infant purposely kept on diets deficient in vitamin B_6 more than 20 years ago. They were produced accidentally in hundreds of American babies given a commercial formula lacking this vitamin, though I have yet to find out why such a formula was not tested on animals before being sold or why at least one pediatrician was not sufficiently informed to check the source of B vitamins for his tiny patients. Again, the seizures stopped immediately when vitamin B_6 was allowed. It has long been known that every type of experimental animal develops convulsions if deficient in either vitamin B_6 or magnesium, which is essential for the absorption of vitamin B_6 and activation of dozens of vitamin-B_6-containing enzymes. For these reasons, the two nutrients should always be given together.

The amounts of these nutrients used to stop convulsions vary widely. Seizures stopped when only 1 milligram of vitamin B_6 was given to a breast-fed baby, though human milk is low in vitamin B_6, especially when mothers use oral contraceptives, which tremendously increase their need for it. Certain infants require 20 times more vitamin B_6 to stop convulsions than do others. For instance, a baby whose mother suffered from epilepsy had convulsions unless he was given 20 milligrams of vitamin B_6 every day. A single injection of 100 milligrams of this vitamin, given during a seizure, has produced "dramatic cures" in minutes, but 10 milligrams daily are usually necessary for infants who have recently had convulsions, and 3 to 5 milligrams later may prevent their recurrence. Much larger amounts have been given with good results, but appear to be unnecessary and may increase the need for other B vitamins.

Similarly, the amounts of magnesium given for convulsions have ranged from 150 milligrams to 500 milligrams daily, or from a mere pinch to ½ teaspoon of magnesium oxide or Epsom salts (magnesium sulfate). Since magnesium is extremely laxative, it is usually necessary to give as much as possible without causing diarrhea. It has been pointed out that pediatricians frequently give calcium injections for what they believe to be low-calcium tetany when the seizures actually result from a magnesium deficiency; and because they may be unaware that the extra calcium increases the need for magnesium, thus making the convulsions worse, the conclusion that the brain has been damaged is quickly reached.

The mother who has studied nutrition calmly adds tiny amounts of calcium, magnesium, and vitamin B_6 to formula or drinking water, and health is perhaps restored in an hour. The less informed or less courageous mother may face lifelong sadness.

Epilepsy. In all probability, epilepsy is identical to the convulsions produced by a lack of vitamin B_6 and/or magnesium, usually called "epileptiform." Physicians who have investigated epilepsy, however, have given either magnesium or vitamin B_6, but rarely both. Since children with epilepsy have unusually low blood magnesium, 30 youngsters who had been kept on anticonvulsive drugs for years yet still suffered epileptic seizures were given ½ teaspoon of magnesium (450 milligrams) daily, and the anticonvulsive drugs were stopped; all recovered completely except one child, who was probably deficient in vitamin B_6. When other epileptic children were given 160 to 300 milligrams of vitamin B_6 daily but no magnesium, a number recovered but others did not. A physician who is a personal friend tells me that he gives epileptic children 1 teaspoon of Epsom salts in juice at breakfast and 25 milligrams of vitamin B_6 with each meal, then stops all drugs after a week; though he later reduces the amounts of vitamin B_6 and magnesium, he reports that not one of his young patients has had a recurrence of epilepsy.

Often epilepsy first develops after drugs have been given for some illness. Penicillin, several other antibiotics, and many types of drugs increase the need for vitamin B_6 so much that a deficiency is produced. Similarly, diarrhea and certain drugs cause a magnesium deficiency to occur, again initiating seizures. Obviously, if drugs must be given to a child or if diarrhea develops, the daily intake of vitamin B_6 and magnesium should be temporarily increased.

Many states will not allow a person, once he has been diagnosed as an epileptic, to marry or to drive a car. Though epileptics, when not too drugged, are often brilliant individuals, the disease is frequently considered a form of mental retardation; even today thousands of epileptics are literally held prisoners in mental hospitals. It is not uncommon for members of a family to feel ashamed of an epileptic brother or sister; and the child himself goes through life suffering bitterly from self-hatred and ostracism. For humane reasons, the best of nutrition should be given these children. It may not always help, but perhaps, if started earlier, it could have.

Diabetes. Both because diabetes is rapidly increasing and kills more children annually than any other preventable disease and because physicians tell you it can be neither prevented nor cured, I feel that the research concerning this illness should be reported in detail.

Diabetes has been repeatedly produced in experimental animals. For example, if vitamin B_6 is lacking from the diet, protein cannot be utilized normally and a toxic substance known as xanthurenic acid (p. 46) forms from the amino acid tryptophane. When rats are given a diet deficient in vitamin B_6 for only two days, the pancreas is so damaged by xanthurenic acid during those short 48 hours that the animals are diabetic. The longer the rats are kept on the vitamin-B_6-deficient diet, the larger is the amount of pancreatic tissue destroyed and the more severe the diabetes becomes. Furthermore, injury to the pancreas occurs long before any recognizable symptoms of a vitamin-B_6 deficiency appear. Even if xanthurenic acid is injected into healthy animals, it damages the pancreas so quickly and severely that diabetes results; the blood sugar soars and much sugar (glucose) is lost in the urine.

If vitamin B_6 is quickly supplied to animals deficient in it, no more xanthurenic acid is formed; the pancreas, if not already too severely damaged, can be restored to health, and the diabetes no longer exists. When the vitamin is not given, however, the diabetes becomes progressively more severe. Even if no vitamin B_6 is allowed, an increased intake of magnesium causes the amount of xanthurenic acid to decrease so much that little harm is done. Conversely, diabetes can be made worse and far more xanthurenic acid is released if the diet is high in solid fats, especially hydrogenated ones such as margarines, solid cooking fats, processed cheeses, and hydrogenated peanut butter, all of which increase the need for both vitamin B_6 and magnesium.

The knowledge gained from animal experiments appears to apply equally to humans. For example, without exception all diabetics excrete large amounts of xanthurenic acid, especially when the disease is severe or uncontrolled or when diabetic retinitis occurs. Furthermore, the quantity of this acid lost in the urine is the test of a vitamin-B_6 deficiency in humans. Incidentally, xanthurenic acid held in the urine before voiding causes animals to develop cancer of the bladder. Persons deficient in vitamin B_6 excrete xanthurenic acid long before any deficiency symptoms can be observed. Though the amount of this toxic acid increases as the deficiency becomes more severe, especially if the protein intake is high, none is formed by individuals with an adequate vitamin-B_6 intake. Similarly, when 50 milligrams of vitamin B_6 have been given to diabetics, the amount of xanthurenic acid excreted has decreased as much as 97 per cent in a single day; and if they continued taking 10 to 20 milligrams of the vitamin daily, no xanthurenic acid was formed. During World Wars I and II, when diets were low in fats, which decrease the need for vitamin B_6 and magnesium, and these nutrients were supplied because grains were not allowed to be refined, diabetes almost disappeared.

It is known that entire families may require many times more vitamin B_6 and/or magnesium than do others. The fact that diabetes is hereditary now appears to mean nothing more than a high genetic requirement for magnesium and/or vitamin B_6. Magnesium is abnormally low in the blood of diabetics. I believe that youngsters with a family history of diabetes should be given vitamin B_6 and magnesium daily while they are still well.

Mothers frequently write that their children, some of them mere babies less than 18 months old, have developed diabetes after being given a drug, usually an antibiotic. Diabetes has been produced in rats by giving them penicillin, even when vitamin B_6 seemed more than adequate. Numerous drugs increase the need for vitamin B_6, causing xanthurenic acid to be excreted by the children given them, though none of this toxic acid is formed when vitamin B_6 is allowed with a drug. If diabetes is to be prevented, any child given a drug should probably receive simultaneously 5 or 10 milligrams of vitamin B_6 daily.

Diabetes in children is usually far more serious than in adults; hence insulin substitutes are largely ineffective and insulin itself must be given. One reason why diabetes in babies is so serious is that their diets are usually deficient in vitamin B_6 and magnesium. Frequently physicians react negatively when parents ask permission to give these nutrients to a diabetic child. Yet the pancreas has already been damaged; and research indicates that if some insulin-producing cells still remain healthy, vitamin B_6 and magnesium may prevent the disease from becoming more serious, and also that a delay of a few days or perhaps hours might cause the destruction to become irreparable and irreversible, making lifelong insulin injections necessary. No mother can stand by and do nothing, especially if she has ever seen a beautiful child go blind with diabetic retinitis. Whether or not dietary improvement can help will depend on how quickly essential nutrients are added to the diet and the extent of the damage already done.

As long as some cells of the pancreas remain healthy, improved nutrition can occasionally stimulate the production of natural insulin enough that insulin injections are no longer needed. Though, of all nutrients, vitamin B_6 and magnesium remain most important in the daily diet of a diabetic child, the following foods have increased insulin output: yeast; large amounts of vitamin C; pantothenic acid; vitamin B_{12}; and 300 units or more daily of vitamin E alone or vitamin E with 3 tablespoons of lecithin. Small, frequent meals high in protein have also stimulated insulin production. A lack of manganese, low in the blood of diabetics, causes diabetes in animals; and wheat germ, the richest source of manganese, has improved the disease in humans. Too little chromium, a trace mineral deficient in American soil, and available now only for research, also causes experimental diabetes; and 250 micrograms given daily to babies are said to have corrected the illness. Potassium, vital to the utilization of sugar, is extremely important to the diabetic; therefore, this nutrient must be kept high in the diet and the salt intake somewhat limited to prevent potassium from being lost in the urine (p. 242). Unfortunately, diets planned by diabetic specialists often contain almost none of many of these nutrients.

No one knows what would happen if magnesium and vitamin B_6 were given to diabetic children the day the disease was diagnosed and if an adequate diet were to be allowed them. It is possible that the diabetes could then be prevented. We know only too well what happens when these dietary improvements are ignored. Not to try to prevent the disease, now that much is known, seems inhumanly cruel, but time is of the essence; the destruction of pancreatic tissue quickly becomes irreparable.

Nephritis. Another disease causing children to suffer for years and bringing death to many is nephritis, or acute kidney inflammation. The kidneys become so damaged that antibodies, the blood protein albumin, and millions of red blood cells and dead kidney cells are lost in the urine. The damaged kidneys may be unable to throw off substances from the breakdown of body proteins, such as urea, which are normally excreted in the urine; thus they may accumulate in the blood. The blood pressure usually soars, and retention of fluids causes the face, hands, and ankles to become puffy.

Acute nephritis is produced in animals by diets low in the B vitamin cholin. The kidneys hemorrhage, blood and albumin are lost in the urine, fluids are retained, and blood pressure soars. The blood cholesterol becomes excessive; in children with nephritis it may reach 500 to 700 milligrams instead of a normal 180. Soon the kidneys become filled with non-functioning scar tissue. Because solid fats increase the need for cholin, they make the disease worse. Though a lack of this vitamin causes liver damage, the kidneys are harmed long before the liver becomes abnormal. When calves have been put on a diet lacking cholin, they die a week later of acute nephritis and massive kidney hemorrhages. Identically treated calves, given 1,000 milligrams of cholin as late as the sixth day, appeared to be well 24 hours later.

As long as protein is adequate, cholin can be formed from methionine, provided this amino acid is not needed to synthesize new body tissue and the diet is adequate in vitamin B_{12} and folic acid. The demands of growth, however, have priority; hence, it is the beautiful, rapidly growing child who gets nephritis. If the disease retards growth sufficiently to decrease the protein requirement enough methionine can be changed into cholin that recovery occurs.

A lack of other nutrients can also cause destruction of kidney tissue. All species of animals, including insects, develop nephritis if not given essential fatty acids. Furthermore, as we have seen, these essential fatty acids, as part of the structure of cell walls, break down when vitamin E does not protect them from oxygen (p. 200). Animals deficient in vitamin E, therefore, also develop nephritis. The blood vessels thus become fragile; and red blood cells and proteins far too huge to pass through healthy artery walls leak into the urine. When 300 units or more of vitamin E have been given daily to small children near the onset of acute nephritis, the blood pressure has quickly decreased, fluids were no longer retained, and blood and albumin disappeared from the urine. Instead of the disease lasting for five years, as it often does, the children were usually well in a week. Similar kidney damage caused by nitrates and sometimes fatal to babies can also be prevented by vitamin E.

Still other nutrients are important. Animals lacking magnesium develop nephritis, with large amounts of calcium deposited in the kidney tissue. If vitamin B_6 is also undersupplied, the damage becomes far worse, and the kidney fills with scar tissue, which is unable to form urine. Moreover, the vitamin-B_6 deficiency allows oxalic-acid kidney stones to form, which can be fatal to children.

When the kidneys have been so damaged that blood is passed, all nutrients can be lost in the urine: not merely proteins but vitamins A, C, the B group, and all minerals as well. Unless the diet is improved immediately, such losses soon induce multiple deficiencies which cause the disease to become rapidly more serious, and increasingly larger quantities of blood, albumin, and all nutrients are lost in the urine. Such a severe vitamin-A deficiency can be produced, for example, that the kidney tubules become plugged with dead cells; little urine can be formed, and wastes cannot be excreted.

Whatever the cause of nephritis, the diet should be made completely adequate the minute the diagnosis is heard. Delay can cause death. I have known of many children who were allowed to die without a milligram of cholin, vitamin E, magnesium, or essential fatty acids being added to their diets. Their physicians did not consider these nutrients to be important. Their mothers lacked the courage to give them.

On the other hand, when the diet is made adequate immediately, improvement in health is often spectacular. Again and again parents have told me of a child who has recovered from nephritis within days after all essential nutrients were allowed. A few of these children had already been put on a kidney machine. The seriousness of the illness, however, appears to be in proportion to the length of time the mother delays before making nutritional improvements.

Celiac disease. During celiac disease, diarrhea becomes so severe that parts of the intestinal walls actually slough off; and the stools, foamy as beaten egg white, float in the toilet. These symptoms are caused by a violent allergy to gluten, a protein found in grains. If a child with this disease is allowed no foods containing wheat, rye, millet, corn, or barley, the diarrhea clears up. Soy muffins, hot cakes, and crackerlike snacks can be used instead of breads, and brown rice may be served as cereal. The disease, however, still exists, and the diarrhea usually returns any time gluten is eaten.

The cause of the allergy remains unknown. It is known that children who have had celiac disease frequently develop schizophrenia during adolescence. Since schizophrenia is now being treated successfully with huge amounts of the B vitamin niacin amide, and since a lack of niacin amide causes severe diarrhea (p. 248), it may be that the children subject to celiac disease have an unusually high requirement for this vitamin. When I have planned diets for children with celiac disease, therefore, I have emphasized all nutrients known to help overcome allergies (ch. 29) and have recommended 500 milligrams or more of niacin amide after each meal. These children seem to have had unusually good results. Furthermore, I always suggest that the quantity of niacin amide per day be increased during adolescence.

Cystic fibrosis. A disease frequently ending in tragedy is cystic fibrosis, characterized by diarrhea, failure to absorb fat, and massive amounts of scar tissue laid down in the pancreas. It may be that this disease starts with a mere iron deficiency. Children with iron-deficiency anemia lose fat in the stools, but if the anemia is corrected, fats are again well absorbed. The disease, however, may be caused by the loss of bile acids, essential for the absorption of fats and vitamins A, D, E, and K, which dissolve in fat. Children with cystic fibrosis quickly become deficient in these vitamins, and as a result they are particularly susceptible to infections. Furthermore, the formation of scar tissue is characteristic of a vitamin-E deficiency, though when the disease is first diagnosed, the pancreas is said to be healthy. A normal pancreas produces enzymes needed to digest all foods, but scar tissue is incapable of synthesizing enzymes. The combination of persistent diarrhea, incomplete digestion, and faulty absorption causes so many nutrients to be lost in the feces that multiple deficiencies quickly occur, and the need for all nutrients skyrockets.

Some authorities suggest cystic fibrosis could be prevented if vitamin E were given to all children. The amount of this vitamin in the blood of children with cystic fibrosis becomes abnormally low, and red blood cells break down, showing severe vitamin-E deficiency. From 300 to 1,500 units of vitamin E have been given daily to children with this disease, but usually long after the onset of the illness when little or none may be absorbed.

The nutrition should be improved the minute the diagnosis is made. To insure digestion, ½ teaspoon of powdered or liquid enzymes can be mixed with food at each meal. Foods may be seasoned or cooked in small amounts of oil, which is more completely absorbed than solid fats. Because vitamins A, D, and E absorb well through the skin, concentrates of these vitamins might be rubbed on the skin every day. No one knows if immediate dietary improvement could change the course of the disease. To my knowledge, it has never been tried. Irreparable damage is so quickly done that later improvement has met with little success.

Scleroderma. The disease scleroderma, which is now rapidly increasing among infants, was formerly considered to be fatal. In this illness, huge amounts of calcium are laid down in soft tissues, especially in injured areas. Scleroderma has been produced experimentally and can be prevented or corrected only by large amounts of vitamin E. Similarly, vitamin E has been given to several hundred babies suffering from scleroderma, and when the vitamin is allowed them before the disease has become too far advanced, they have been restored to health.

Speed is vital. Even though each disease appears to result from deficiencies of a specific combination of nutrients, the body requirements necessary to build health stay essentially the same regardless of the name of an illness. For this reason, the nutrition should be improved and all nutrients generously supplied as soon as an illness occurs. Whatever the disease may be, if you are planning a diet for your child, see that the protein is ample, that some vegetable oil is supplied, and that every vitamin and every mineral are generously furnished. If you make this improvement quickly enough, a disease which is often serious can sometimes disappear in a few days.

When the cause is unknown. I get dozens of letters from desperate parents telling me that a child has some little-known disease which I have failed to mention. Almost invariably no research has been done concerning the effect of nutrition on that particular illness.

The important facts to remember are that the nutrients necessary to build health always remain the same regardless of a diagnosis or the nature of an abnormality; that all disease is stress, which immediately increases the need for every body requirement; and that the more quickly the diet is improved, the greater is the chance of recovery. To say that a disease is "incurable" does not mean that it cannot be cured but only that the cure is at present unknown. Since few ill children are ever allowed good nutrition, the value of an adequate diet in correcting illness is still a mystery.

CHAPTER THIRTY-ONE

Your Child Grows Up

As long as a child is growing, his nutritional requirements remain high. To supply him with all essential nutrients, a large amount of food is needed, yet his stomach stays comparatively small. If he is to reach his genetic potential, there is no room at any time for trash foods.

One can be fairly sure of raising healthy children merely by making every effort to remain healthy parents. Let us, however, summarize the foods a child should have daily not only while he is young, but every day until he becomes an adult.

General rules to follow. Regardless of the age of a person, the nutrients he requires and their sources remain the same. Ideally, each of the following foods should be had daily:

1. One quart of whole cows' or goats' milk (even for an obese child), preferably medically certified raw or other safe raw milk; includes yogurt, buttermilk, pep-up, and milk used in cooking, skim milk if drunk at same meal at which butter or whole-milk cheese is eaten.

2. One-half to 1 cup of unsweetened yogurt or acidophilus milk made of whole milk or with 2 tablespoons of light cream added per cup; can be made into popsicles by combining with frozen, undiluted orange juice and vanilla. If yogurt or acidophilus is not used, a yogurt tablet or ½ teaspoon of acidophilus culture should be given daily in or with milk for one month out of every three (implanted bacteria survive in the intestine two or three months).

3. Yeast, liver, and/or wheat germ; whole-grain breads and cereals. If these foods are not eaten, supplements in liquid or tablet form should be given, provided they furnish all B vitamins in approximately the same proportions as in healthy tissues (p. 105).

4. Two or more fruits, preferably fresh; 1 orange eaten with white of rind. Use fruits for mid-meals and desserts, avoiding heavily sweetened canned or frozen ones.

5. One or two eggs.

6. One or more servings of cheese, including cottage cheese and all natural solid or cheddar-type cheese. Avoid processed cheeses.

7. Two or more servings of vegetables, using green or yellow ones most often, especially cooked green leafy ones; fresh in preference to frozen or canned; salad daily after age of five.

8. One or two servings of meat, fish, fowl, or a meat substitute consisting of a mixture of two or more vegetable proteins eaten at the same meal.

9. One to 3 teaspoons of cold-pressed vegetable oil, used as seasoning, in cooking, and in mayonnaise or salad dressing, preferably a mixture of two or more oils, such as corn, safflower, soy, peanut, or sesame; or 2 tablespoons natural nut butter or pecans, walnuts, or peanuts (50 per cent oil).

10. Iodized salt used exclusively; granular kelp used as seasoning and/or given as supplement.

11. Use butter in preference to margarine; a modified butter can be prepared by blending 1 cup of vegetable oil with 1 pound of butter.

12. If desired, occasionally use small amounts of honey, maple syrup, or dark molasses.

13. One teaspoon or more of cod-liver oil daily until the age of 12; should supply at least 10,000 units of vitamin A and 1,000 units of natural, non-toxic vitamin D. If oil cannot be taken, use drops of fish-liver-oil concentrate in oil (avoid water-miscible varieties, in which vitamin A is unstable and vitamin D can be toxic); after the age of 12, change if desired to a capsule supplying 10,000 units of natural vitamin A and 1,000 units of natural vitamin D. Always take after a meal containing fat. Keep oils refrigerated, and give only if vitamin E is taken daily.

Check each child's intake. Since health is far too important to be left to chance, check each child's intake frequently to see that he is obtaining all essential nutrients. Use the following list as a guide:

1. *Protein:* milk, buttermilk, yogurt, pep-up, yeast, cheese, eggs, meat, fish, fowl; legumes, whole grains, nuts, and other vegetable proteins, valuable only if two or more are eaten at the same meal. Count protein grams frequently and compare to required intake for age (p. 308).

2. *Linoleic acid:* rich in most vegetable oils except olive oil; some in butterfat and fat from poultry.

3. *Carbohydrates:* legumes, grains, breads, cereals, fruits, and vegetables.

4. *Calories:* fats and carbohydrates are principal sources, though all foods, including proteins, supply calories

5. *Bulk:* fruits, vegetables, whole-grain breads and cereals.

6. *Vitamin A:* yellow and green fruits and vegetables, provided they are free from nitrates; eggs, liver, whole milk, cream, butter, margarine; fish-liver oils and fish-liver-oil concentrates.

7. *The B vitamins:* yeast, liver, wheat germ; whole-grain breads and cereals; produced by intestinal bacteria such as those supplied by yogurt or acidophilus; small amounts in most unrefined foods.

8. *Vitamin C:* citrus fruits, ripe peppers, cabbage, small amounts from most fresh, raw fruits and vegetables; tablets and powder (1,000 milligrams per ¼ teaspoon).

9. *Bioflavonoids:* pulp of citrus fruits and white of rind; helpful but not essential when vitamin C is generously supplied.

10. *Vitamin D:* fish-liver oils and fish-liver-oil concentrates; obtained from summer sun (May through September) only if air is clear and oils are not removed from skin. Needed daily throughout entire growth period.

11. *Vitamin E:* lost when grains are milled and oils are refined; adequate amounts obtainable from supplements of d-alpha tocopherol acetate, available alone or with fish-liver-oil concentrates. Capsules may be pierced with a needle and squeezed directly into a child's mouth, give 50 to 100 units daily up to age of 12; 200 units or more daily thereafter throughout life.

12. *Vitamin K:* cabbage, cauliflower, spinach, liver; synthesized by intestinal bacteria. Deficiency produced by oral antibiotics; implant fresh bacteria by eating yogurt or yogurt tablets or acidophilus milk or culture.

13. *Calcium:* 1 gram or more needed daily throughout entire growth period; this quantity can be obtained from 4 ounces Swiss or cheddar cheese, 4 cups cottage cheese, or 1 quart whole milk, buttermilk, yogurt, or acidophilus prepared from whole milk; 1 gram can also be obtained from ½ teaspoon bone meal, 2 teaspoons calcium carbonate, 1⅔ tablespoons calcium lactate, 3 tablespoons calcium gluconate, or ⅔ egg shell; tablets available of magnesium and calcium combined. Calcium is not well absorbed unless taken with milk sugar, vitamin D, and fat, though quantity of fat desirable is unknown.

14. *Magnesium:* friuts and vegetables, especially green leafy ones, if grown without chemical fertilizers on magnesium-rich soil; all children not obtaining such food should have daily ¼ teaspoon or more of magnesium oxide or sulfate (Epsom salts), which furnishes approximately 250 milligrams of magnesium; tablets of calcium and magnesium combined desirable for older children.

15. *Phosphorus:* milk, eggs, cheese, meats; all unrefined foods. For every 1,500 milligrams of phosphorus in the diet, there should be no less than 1,000 milligrams of calcium and 500 milligrams of magnesium.

16. *Potassium:* fruits, vegetables; unrefined breads and cereals. A child should obtain approximately 3,000 milligrams daily, or as much potassium as sodium.

17. *Iron:* yeast, liver, wheat germ, egg yolk, green vegetables, whole-grain breads and cereals. Food iron is never toxic.

18. *Iodine:* Iodized salt; kelp used generously as a seasoning and/or taken in tomato juice, preferably ½ teaspoon daily for small child, 1 teaspoon for older one.

19. *Trace minerals:* seafoods, egg yolks, liver, yeast, green leafy vegetables if grown on mineral-rich soil; daily supplement valuable provided it contains no toxic iron salts or is given eight hours after vitamin E has been taken.

Menu plans and mid-meals can be essentially the same as those already suggested (p. 107). Mid-meals are particularly important for children, provided no refined foods are allowed.

Learn the sources of all essential nutrients so thoroughly that you can check in a moment to see if a child's diet is adequate. When a nutrient is not obtained from food, a suitable supplement should be used. In nutrition as elsewhere, the chain is only as strong as its weakest link.

Form the pep-up habit. If a mother will prepare fresh pep-up (p. 101) for herself each morning and sip a 4- to 8-ounce glass of it at breakfast, her children will accept this procedure as a way of life. Such a drink is so rich in nutrients that it usually keeps the blood sugar high and efficiency at peak throughout the day. Even a husband not enthusiastic about nutrition will want the vitality his wife possesses and will soon drink pep-up with her provided he has not been urged to do so. The children naturally imitate the parents.

For a child who has not developed a taste for yeast, pep-up should first be offered in a tiny glass, such as one sold for serving liqueurs. Showing approval as soon as he has drunk it soon establishes the morning ritual. This one procedure alone can prevent the tragic "neglected age," which often occurs when a child is about two years old. The mother may be pregnant again or perhaps already has another baby, and is overbusy and exhausted. The child is now eating at the family table, and unless the parents are particularly interested in nutrition, he may be allowed white bread, cold cereals, and other offer-nothing foods. Beautiful children who have been breast-fed but have never developed a taste for yeast or cod-liver oil often lose their health quickly. Even though a child is brilliant and attractive, inadequate nutrition before the age of five can cause him to become physically homely and mentally dull.

When our youngsters were young, we usually had a breakfast of fresh juice or fruit, some protein, such as liver, eggs, or yogurt, and a small glass of fortified milk. As they grew older, they were given a choice of a typical breakfast or a large glass of pep-up. Through most of high school, when George wanted more time to sleep and Barbara performed mysterious rites on face and hair, pep-up was usually their choice. Because it was made with eggs, frozen undiluted orange juice, and assorted "goodies," and supplied about 30 grams of protein per glass, it furnished far more nutrients than do most meals. With it, the youngsters took a 500-milligram tablet of vitamin C and capsules supplying vitamins A, D, and E; hence their nutrition, though simple, was adequate. It was made possible mainly because this procedure had been an accepted one since early babyhood.

Good food habits are imitated. Mothers frequently complain that their children will not eat certain health-building foods. I am convinced that youngsters will learn to enjoy any food if the mother herself will repeatedly eat it in front of them without offering them any. As soon as they ask for the food in question, give only a tiny amount and praise them for tasting it; repeat the procedure at a later date. Some children, however, refuse food because it is of poor quality and/or badly cooked. learning to cook to improve health is important, easy, fun, and rewarding.

Another common complaint is that children will not eat some food, such as liver, because their father does not enjoy it. A wife is surely aware of her husband's dislikes long before children arrive. In case a food is important, simply serve it at any meal when the father is away. If a mother herself eats well, her children will do likewise.

Avoid the offer-nothing foods. Probably 70 per cent of all children in the United States are malnourished; and at least 70 per cent of all foods now sold in our supermarkets, if fed to experimental animals, would cause them to become diseased and die. For example, Dr. Roger J. Williams, of the University of Texas, by feeding rats so-called "enriched" bread, caused two-thirds of them to die within 90 days. By adding to such bread magnesium, manganese, copper, calcium, folic acid, vitamins B_6 and E, pantothenic acid, and the amino acid lysine, *all of which are discarded during milling,* animals achieved superior growth. Dr. Williams stated; ". . . ordinary white bread is so deficient that it is intolerable." Three decades ago, the late Dr. Agnes Fay Morgan, then at the University of California, showed that rats given "enriched" flour died long before control animals allowed ordinary white flour. Similarly, in 1970, Robert Choate, testifying before a Senate committee, reported that most cold breakfast cereals had almost no nutritional value; and that the worse the cereal, the more it was advertised on children's television shows.

A delicious and highly nutritious cold cereal can be prepared at home by mixing together 5 cups of old-fashioned rolled oats and 1 cup each of sesame seeds, shredded coconut, sunflower seeds, chopped almonds, non-instant powdered milk, soy flour, and wheat germ. In a separate utensil, mix 1 cup each of vegetable oil, honey, and water, and combine with the dry ingredients. Spread on 2 cookie sheets and bake at 300°F. for 1 hour or until slightly brown. Crumble and store in an airtight container. Allow children only tiny amounts until they have had time to learn to enjoy the new flavor; avoid telling them that it is good for them.

The health-robbing foods. Many products offer almost no nutritive value. Their sole purpose is to make money for manufacturers, usually at the expense of children's health. Dozens of examples could be given. For instance, an imitation "fruit drink" which has made millions for the company producing it consists of refined sugar, fumaric acid, monosodium phosphate, propylane glycal, diocetyl sodium sulfosuccinate, artificial dye, artificial flavoring, and tiny amounts of vitamin C and calcium carbonate.

Another example is a soft drink known to be high in sugar, caffeine, and phosphorus acid, but the contents of which have never appeared on a label. Our morning paper lists the enormous earnings of the company producing this soft drink. To obtain these huge earnings, millions of children are cruelly made to endure unimaginable suffering from toothache alone—they have an estimted 700 million unfilled cavities—yet the consumption of this drink certainly contributes markedly to ill health.

An informed mother who loves her chidren enough not to want to see them suffer simply does not bring such junk foods into the house. In addition to the long list of trash foods given on page 109, which should be avoided if health is to be achieved, approximately 1,500 new "foods" appear on the market each year, many of which have little or no nutritive value. It is time to face the fact that when a mother allows her children's appetites to be destroyed and their stomachs filled with foods offering few or no nutrients, she is producing illnesses in them as surely as does the scientist who gives these same foods to experimental animals.

Persons not educated in nutrition are literally left to the mercy of food processors who know little or nothing about health and apparently care even less about children, though the $100-billion-a-year food industry is actually crippling most Americans by promoting impoverished foods. In several of our Southern states, for instance, where both money and nutritional information are lacking, as many as 50 per cent of the pregnant women suffer from toxemia. They are producing thousands of physically inferior, brain-injured, often congenitally defective infants whose miserable lives must be indefinitely supported at a cost to the taxpayer far greater than the price of prevention.

Additives, preservatives, and contaminants. Some 3,000 additives are permitted in processed foods. Each manufacturer supposedly guarantees the "safety" of the additives he uses, though the safety of many additives combined in the same food has never been determined. Some ice creams, for example, contain 20 or more additives. Often, after an additive has been ballyhooed for years as being safe, it is discovered to produce cancer or other abnormalities in animals—examples are butter yellow, a food dye; agene, used in bleaching flour; and the cyclamates, or sweetening agents. Saccharin, though still permitted, has been shown to cause tumors in animals; monosodium glutamate, which enhances flavor, produces brain lesions in newborn rats; and carrageenan, a thickening agent added to infant formulas, causes ulcers in guinea pigs.

Preservatives may prove to be equally hazardous. Though nitrates from chemical fertilizers destroy vitamins A and E and, by being changed into nitrites, have caused the deaths of infants (p. 213), nitrates are added to smoked fish, corned beef, frankfurters, luncheon meats, and ham, even ham canned for babies; supposedly the nitrates prevent botulism, though scientists of the FDA say they are not effective and could be replaced. Drs. Melvin Greenblatt and Sidney Mirvish, of the University of Nebraska, have produced cancers in mice by feeding nitrites. Dr. Samuel S. Epstein, of Harvard Medical School, has pointed out that nitrites, by changing into nitrosamine in the body, can produce cancers in many organs of a wide variety of species; and that the evidence justifies reducing the nitrates permitted in foods. Nitrates are nevertheless still allowed.

Again, food preservatives may be harmless alone but dangerous when combined with other preservatives and assorted chemical additives. Usually the same food is available without preservatives. For example, I buy frankfurters, corned beef, and luncheon meats without nitrates; they are simply kept frozen until needed. The whole-grain flours and breads sold at health-food stores are free from preservatives, whereas most of these same products sold in supermarkets contain large amounts, particularly the brown-and-serve rolls. And I have yet to understand how any self-respecting housewife, regardless how busy, can serve precooked potatoes kept edible only by quantities of butylated hydroxyanisole and butylated hydroxytoluene.

Another source of possible danger is diethylstilbestrol, used to fatten steers and chickens; this female sex hormone, when given to test animals, has caused cancer. Though nine foreign countries no longer permit the importation of beef from the United States because of diethylstilbestrol contamination, in 1970 the FDA allowed the quantity added to feeds to be doubled. To avoid contamination, farmers are asked to stop feeding this hormone two days before marketing their animals, but they understandably sell the day the price is high; and cleaning out feeding machinery containing the hormone-"enriched" food is too much work for most farmers to bother with. Except for liver (as a detoxifying organ, it can protect itself better than do other tissues), I have simply stopped serving beef unless I know the animals have been given food free from stilbestrol; instead, I serve more veal, lamb, pork, and fish, and purchase poultry which is not fed diethylstilbestrol.

Dozens of other food contaminants, such as arsenic dusts and sprays, DDT, lead compounds, and assorted pesticide and herbicide residues, are in and on most of our commercially grown foods; many of these, when tested on animals, have proved to be cancer-producing. They cannot be washed off because they fall on the ground, are dissolved in soil solution, and are carried into the very cells of food itself. Though we hear most about DDT contamination, many pesticides are far more toxic, especially endrin, thiodan, aldrin, and dieldrin; and despite this fact, the production of pesticides in America increased from $440 million in 1964 to $12 billion in 1969, and still greater use is expected.

Increasing even more rapidly are the frightening herbicides, which an FDA scientist has said are the most toxic substances they have ever tested. Their use was banned in Vietnam after they caused miscarriages, chromosome damage, congenital deformities, and birth monstrosities in animals and humans alike. Throughout our country these identical herbicides are being used on food crops, forests, range lands, recreation areas, and elsewhere to destroy weeds and undergrowth. When tested on pregnant animals, nearly every offspring is deformed: some have no eyes, others one eye or a misplaced eye; birds are born with no wings, or with both wings on one side; goats have two mouths; in all animals, the muscles and almost every organ are damaged. Teen-age girls living near areas sprayed annually since 1965 have hemorrhaged so continuously that hysterectomies were necessitated, and 65-year-old women have resumed menstrual periods. In some areas of our country, soils have already become so barren that not even a blade of grass will grow. If the use of these herbicides continues, predictions are that our most fertile lands will be sterile deserts by 1985. Many of the great deserts of the world have once been garden spots. Furthermore, these herbicides now contaminating our food and water supplies are classifed by the National Cancer Institute as carcinogens—cancer producers.

A few decades ago, cancer among children was unknown; it is now a major cause of their deaths. The increase in deaths parallels the use of refined and processed foods, chemical fertilizers, poison sprays, food additives, and preservatives. Only the naïve could believe the two are unrelated. As long as mothers complacently feed their children this type of food, they should expect the incidence of cancer to remain high or to increase, and often to take the lives of their youngsters.

Junk foods will disappear from the market as soon as women refuse to buy them; and wholesome foods grown without chemical fertilizers or poison sprays can become available whenever the homemakers demand them.

Organically grown foods. Any food produced without chemical fertilizers and poison sprays is said to be grown organically. Before a food becomes superior, however, the soil must be rich in natural minerals and composts, or humus from decayed matter, and be free from the poisons which contaminate it from the thousands of tons used each year for decades. Humus in the soil is necessary to support the growth of molds and funguses; molds produce antibiotics that repel insects; and funguses feed plants by dissolving and carrying minerals into their roots. Foods grown on mineralized soils rich in humus are unbelievably sweet and delicious; and they keep for long periods without spoiling. Plants grown on such soils do not attract the insects which destroy unhealthy ones.

Many of our soils, exhausted by years of agriculture, contain too few minerals and too little humus to grow superior foods. Every year, however, $3 billion of our tax money is paid to farmers for *not* raising certain crops, or for allowing land to lie fallow. Simultaneously, almost every large city in America pollutes rivers, lakes, and oceans with sewage wastes. These wastes, properly treated, could become rich humus needed by our depleted soils. The $3 billion now wasted annually could be used constructively to help cities build sewage-disposal plants; the resulting humus could then be returned to the soil. If farmers were paid only when they showed that their fallow land had increased in minerals and humus, the improvement in health in our country could be tremendous.

For years the food processors have flooded us with propaganda saying how healthy we are, while our people, living on their refined foods, have been dying like flies of cancer and heart disease. They ridicule anyone recognizing the value of natural foods as being a faddist or crackpot. With their millions they control the research in our great universities. They even circulate to public libraries lists of books as "not recommended," including mine, those of Drs. Carlton Fredericks and Roger J. Williams, and any book which might hurt their sales, even cookbooks recommending whole grains. Similarly, chemical interests, wishing to continue making billions from harmful fertilizers, pesticides, and herbicides, have for years blocked the sale of non-poisonous products and ridiculed as a fad every interest in the organic-garden movement. Their propaganda would convince us that everyone would starve if chemical fertilizers and poison sprays were not used, which in itself is an admission of how depleted our soils actually are. Soils can be rebuilt; and highly mineralized soils rich in humus produce more and better foods, rather than less. Some of the richest farm land in the world—in France, for example—has been intensively farmed for centuries without chemicals. Persons in the departments of agriculture of several universities have told me that, by controlling the money available for their research, these commercial interests make it impossible for them to investigate the value of foods grown without chemical fertilizers and poison sprays.

Producing your own food. The ideal, now being achieved by thousands of wonderful young couples, is to purchase a plot of ground and have your own chickens and a cow or goat, and grow your own fruits and vegetables. A garden, however, need not be large; a circle of sturdy, fine-mesh fencing, perhaps only 6 feet across, into which is thrown dirt, perhaps manure, and grass clippings, leaves, and any material which will readily decay, can support four tomato plants, one cucumber vine, one zucchini or summer squash, and one or two bell peppers.

When a plot is too small for plowing and perhaps too hard to spade up, an area can be covered with spoiled hay, leaves, or other organic material, then with many thicknesses of wet newspaper; if this area is kept moist, bugs and worms soon do the plowing for you, leaving the ground soft and friable. Should your plot be covered with poison ivy, devil grass, or thick weeds, heavy newspaper mulching allows insects not only to do the plowing but also to eat up all undesired growth. A personal friend, inspired by Ruth Stout's book, *A Green Thumb Without an Aching Back*,* has turned six acres of poison ivy into a paradise of flowers, herbs, and delicious fruits and vegetables mainly with enthusiasm, spoiled hay, and newspapers. A magazine on organic gardening and excellent books on composting are available from the Rodale Press, Emmaus, Pennsylvania.

If space is limited, inexpensive bare-root fruit trees can be espaliered against fence or wall. Though our home is on a small city lot, we have nine fruit trees and a tiny garden only 8 by 24 feet, which produces amazing amounts of delicious vegetables. If you have no land of your own, a vacant lot is often available to anyone who wishes to have fun, exercise, and nutritious food.

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*New York: Exposition Press, 1955.

Until the soil is built up, insects can be controlled by pyrethrin-controlling pesticides made from pyrethrum flowers and from diatomaceous earth,† the finely ground shells of tiny prehistoric ocean life, which acts on insects like ground glass but on house pets like a mineral supplement. Snails and slugs can be controlled by non-poisonous granules which adhere to their surface; attempts to wash off these irritants cause death by dehydration.

Persons who cannot obtain foods grown on good soils must shop the best they can and rely on supplements to make their diets adequate.

Cooperative buying. To decrease costs, families often group together to purchase yeast by the barrel, powdered milk in 50- or 100-pound sacks, quantities of grains directly from farmers, and a small stone-burr mill to grind cereals and flours fresh as they are needed. (Small amounts of mixed grains for cooked cereals can be ground dry in a blender.) Money can also be saved by buying supplements in large amounts. Vitamin C is least expensive when purchased by the kilogram, or 2.2 pounds, which sells for approximately $5 wholesale or $10 retail, and is usually enough to supply a family for a year. It is identical to natural vitamin C, and can be ordered through health-food stores, drugstores, and markets; ¼ teaspoon of the powder supplies 1,000 milligrams of the vitamin.

Unless you are willing to support legislation, however, it may soon be impossible to buy supplements of any value.

Proposed FDA regulations. In 1966 the FDA released proposed rulings which would limit the sale of all vitamin and mineral supplements to tiny, almost useless amounts, unless purchased on a physician's prescription. For example, no more than 2 milligrams of vitamin B_6, 100 milligrams of vitamin C, 30 units of vitamin E, and comparable amounts of other nutrients could be bought over the counter. Furthermore, the FDA proposes to force manufacturers to put on every label the untrue statements that vitamins and minerals are supplied in abundance in commonly available foods; and that, except for ill persons, there is no scientific basis for recommending dietary supplements. They also propose to forbid manufacturers from even implying on labels or in advertising the fact that dietary deficiencies exist because foods are grown on poor soils or that losses occur during storage, transportation, processing, and cooking. They would, therefore, suppress truth as effectively in America as it is in iron-curtain countries.

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†Available from the Perma-Guard Company, 1701 East Elwood Street, Phoenix, Arizona.

Dr. Jean Mayer, professor of nutrition at Harvard, testifying at the FDA hearings in 1970, called the proposed regulations "unjustified, childish, and fallacious"; and he pointed out that people who eat little or unwisely need vitamin and mineral supplements, which are often less expensive to buy—vitamin C, for example—than it is to obtain the particular nutrients from food. Even while these hearings were being conducted, Dr. Arnold Schaeffer reported to the Senate an investigation which offered convincing evidence that millions of Americans are suffering from severe nutritional deficiencies.

Though years of public hearings have been held and many outstanding scientists besides Dr. Mayer have protested that these proposals would be harmful, the FDA has not changed its position one iota. Just as folic acid, iodine, PABA, and pangamic acid are already restricted to nearly useless amounts (with the result that research on these nutrients has stopped, prices have skyrocketed, and drugstores often no longer stock these items), so can the sale of all worth-while supplements be prevented. If these proposed rulings are passed—and it appears now that they will be—the increase in illness will be tremendous; and people unable to get nutritious foods will have no way to protect themselves. Organized medicine and drug manufacturers, producers of chemical fertilizers and poison sprays, and food refiners and processors, however, will all have greater power and vastly increased financial gains. Though the rulings made by the FDA are only bureaucratic edicts, *they nevertheless have the power of law.*

The Hosmer bill. Each year since 1967 a bill has been introduced into Congress which would amend existing laws so that the FDA could no longer treat valuable nutrients as if they were dangerous drugs. It would allow citizens to purchase whatever supplements they wish and manufacturers to state truths on their labels and in advertising. Though it must become law if our health and liberty are to be preserved, it has failed each year because, so far, too few people have been interested in supporting it. For your own sake and that of your children, I urge every reader concerned about the welfare of our country to write to his representative, his senator, and the President, asking that laws be passed to prevent the FDA from restricting the sale of any harmless nutrient to prescription only.

While you are writing, demand that the sale of all highly toxic pesticides and herbicides be quickly stopped; and that the $3 billion given annually to farmers for not planting crops be used to improve soils and decrease pollution.

Your contribution. The outlook is not bright. Greed-motivated commercial interests have already succeeded in ruining much of the health of our people and of our land; only mass education can stop them. With concerted effort, however, it is possible to leave our children a legacy of a wonderful country. Despite faulty agricultural procedures and the overabundance of refined and processed foods, parents can still raise children with superb minds and beautiful bodies, though it is not easy.

As these superior children go into the community and eventually into the world at large, their straight bodies, excellent bone structure, attractive appearance, athletic prowess, mental alertness, and quick grasp of social needs are all advertisements of your own efficiency as parents. You have given of yourselves; and your gifts of magnificent children are badly needed in this sorry world.

Tables of Food Composition

Foods vary somewhat in composition; and the nutrients listed in the following tables are no more important than magnesium, cholin, pantothenic acid, and the many other items not listed. A comparison of nutrients obtained in one day with the Recommended Daily Dietary Allowances, however, often reveals many flaws in a diet. Since these allowances are designed for healthy individuals, ill ones should receive two or three times the amounts of all nutrients except sodium and possibly calories. Unfortunately, no data are available for the highly nutritious foods that can be prepared at home.

Because of people who must stay on low-sodium diets, foods are listed unsalted except when salt has been added during preparation, as in packaged cereals and canned soups. People who salt foods lightly should add 3,000 milligrams of sodium to a day's dietary, and those who enjoy well-salted foods, 7,000 milligrams. Normally the intake of potassium should be approximately the same as that of sodium; and the calcium intake should be two-thirds or more that of phosphorus.

The daily dietary allowances given on the following pages, though recommended by the National Academy of Sciences—National Research Council, are lower in all nutrients except calories and iron than research indicates are needed to produce ideal health; they are particularly meager in vitamins A, C, D, and E for all ages and in calcium and magnesium for growing children. Nevertheless, these quantities would prevent deficiencies. Notice that from the age of two years on, the amount of folic acid recommended is greater than one is allowed to purchase without a prescription.

RECOMMENDED DAILY DIETARY ALLOWANCES FOR

	AGE					
	Years from to	*Wgt. pounds*	*Hgt. inches*	*Calories†*	*Protein† gm.*	*Calcium mg.*
Infants	0–½	15	25	lb. × 55	lb. × 1.	500
	½–1	20	28	lb. × 50	lb. × 0.9	600
Children	1–2	26	32	1,100	25	700
	2–3	31	36	1,250	25	800
	3–4	35	39	1,400	30	800
	4–6	42	43	1,600	30	800
	6–8	51	48	2,000	35	900
	8–10	62	52	2,200	40	1,000
Boys	10–12	77	55	2,500	45	1,200
	12–14	95	59	2,700	50	1,400
	14–18	130	67	3,000	60	1,400
Girls	10–12	77	56	2,250	50	1,200
	12–14	97	61	2,300	50	1,300
	14–16	114	62	2,400	55	1,300
	16–18	119	63	2,300	55	1,300
Women during pregnancy				2,200‡	65	1,700‡
Women during lactation				3,000‡	75	1,800‡

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* National Academy of Sciences–National Research Council, Public. 1694, Washington, D.C., Seventh Revised Edition, 1968

† Changed from kilograms to pounds

‡ Adjusted slightly from original

CHILDREN AND PREGNANT AND NURSING WOMEN*

		VITAMINS							
Iron mg.	*Magnesium mg.*	*A units*	*B_1 mg.*	*B_2 mg.*	*Niacin mg.*	*Folic Acid mg.*	*C mg.*	*D units*	*E units*
10	60	1,500	0.4	0.5	7	0.05	35	400	5
15	70	1,500	0.5	0.6	8	0.1	35	400	5
15	100	2,000	0.6	0.6	8	0.1	40	400	10
15	150	2,000	0.6	0.7	8	0.2	40	400	10
10	200	2,500	0.7	0.8	9	0.2	40	400	10
10	200	2,500	0.8	0.9	11	0.2	40	400	10
10	250	3,500	1.0	1.1	13	0.2	40	400	15
10	250	3,500	1.1	1.2	15	0.3	40	400	15
10	300	4,500	1.3	1.3	17	0.4	40	400	20
18	350	5,000	1.4	1.4	18	0.4	45	400	20
18	400	5,000	1.5	1.5	20	0.4	55	400	25
18	300	4,500	1.1	1.3	15	0.4	40	400	20
18	350	5,000	1.2	1.4	15	0.4	45	400	20
18	350	5,000	1.2	1.4	16	0.4	50	400	25
18	350	5,000	1.2	1.5	15	0.4	50	400	25
18	450	6,000	1.3‡	1.8	15	0.8	60	400	30
18	450	8,000	1.7‡	2.0	20	0.5	60	400	30

Equivalents used in the following tables

1 quart = 4 cups
1 cup = 8 fluid ounces
= ½ pint
= 16 tablespoons
2 tablespoons = 1 fluid ounce
1 tablespoon (T.) = 3 teaspoons (t.)
1 stick butter or margarine = ½ cup
= 16 pats or squares

TABLES OF FOOD COMPOSITION

FOOD	*Approximate Measure*	*Wgt. in gr.*	*Calories*	*Protein gr.*	*Carbohydrate gr.*	*Fiber gr.*	*Fat gr.*	*Saturated fatty acid* gr.*
DAIRY PRODUCTS								
Cows' milk, whole	1 qt.	976	660	32	48	0	40	36
skim	1 qt.	984	360	36	52	0	*t*	*t*
Buttermilk, cultured	1 cup	246	127	9	13	0	5	4
Evaporated, undiluted	1 cup	252	345	16	24	0	20	18
Fortified milk, or pep-up†	6 cups	1,419	1,373	89	119	1.4	42	23
Pep-up†	⅔ cup	160	155	10	13	.2	5	2
Powdered milk, whole	1 cup	103	515	27	39	0	28	24
skim, instant	1⅓ cup	85	290	30	42	0	*t*	*t*
skim, non-instant	⅔ cup	85	290	30	42	0	*t*	*t*
Goats' milk, fresh	1 cup	244	165	8	11	0	10	8
Malted milk (½ cup ice cream)	2 cups	540	690	24	70	0	24	22
Cocoa	1 cup	252	235	8	26	0	11	10
Yogurt, of partially skim milk	1 cup	250	120	8	13	0	4	3
Milk pudding (cornstarch)	1 cup	248	275	9	40	0	10	9
Custard, baked	1 cup	248	285	13	28	0	14	11
Ice cream, commercial	1 cup	188	300	6	29	0	18	16
Ice milk, commercial	1 cup	190	275	9	32	0	10	9
Cream, light, or half-and-half	½ cup	120	170	4	5	0	15	13

SOURCES: Agriculture Handbook No. 8 and Home and Garden Bulletin No. 72; U.S. Dept. Agric., Washington, D.C.; Nutritional Data: H. J. Heinz Company, Pittsburgh, Pa., 1963

EDIBLE PORTIONS

	MINERALS					VITAMINS				
Linoleic acid gr.	*Iron mg.*	*Calcium mg.*	*Phosphorus mg.*	*Potassium mg.*	*Sodium mg.*	*A units*	*B_1 mg.*	*B_2 mg.*	*Niacin mg.*	*C mg.*
t	.4	1,140	930	210	450	1,560	.32	1.7	.8	6
0	.4	1,192	940	215	480	0	.4	1.7	.8	6
t	.1	298	270	52	250	180	.1	.4	.2	2
t	.2	570	465	102	236	780	.1	.8	.5	t
14.2	12.1	2,949	3,116	2,704	1,480	2,670	11.5	10.9	103.5	330
1.7	1.4	333	351	300	310	295	1.3	1.2	9.5	37
t	.4	968	1,160	200	810	1,160	.3	1.5	.7	t
0	.4	1,040	940	210	793	t	.2	1.4	.7	t
0	.4	1,040	940	210	789	t	.2	1.4	.7	t
t	.2	315	212	66	66	390	.1	.3	.7	.2
t	.8	270	615	60	398	670	.3	1.1	.2	2
t	.9	280	212	50	120	390	.1	.5	.3	t
t	.1	295	270	50	262	170	.1	.4	.2	t
t	.1	290	260	48	258	360	.1	.4	.1	t
1	1	278	370	100	158	870	.1	.5	.2	t
1	.1	175	150	170	126	740	t‡	.3	.1	t
t	.1	290	250	54	136	390	.1	.4	.2	t
t	t	130	90	95	55	550	t	.2	t‡	t

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* Includes oleic acid

t Indicates trace only

† Made by recipe on p. 101 with 2 eggs, torula yeast fortified with calcium, and a 6-ounce can of frozen undiluted orange juice

‡ Contains less than .1 milligram

FOOD	Approximate Measure	Wgt. in gr.	Calories	Protein gr.	Carbohydrate gr.	Fiber gr.	Fat gr.	Saturated fatty acid* gr.
DAIRY PRODUCTS (*Continued*)								
Cream, heavy, or whipping	½ cup	119	430	2	3	0	47	42
Cheese, cottage,								
creamed	1 cup	225	240	30	6	0	11	10
uncreamed	1 cup	225	195	38	6	0	*t*	*t*
Cheddar, or American	1-in. cube	17	70	4	*t*	0	6	5
Cheddar, grated	½ cup	56	226	14	1	0	19	17
Cream cheese	1 oz.	28	105	2	1	0	11	10
Processed cheese	1 oz.	28	105	7	*t*	0	9	8
Roquefort type	1 oz.	28	105	6	*t*	0	9	8
Swiss	1 oz.	28	105	7	*t*	0	8	7
Eggs, boiled, poached, or raw	2	100	150	12	*t*	0	12	10
Scrambled, omelet, or fried	2	128	220	13	1	0	16	14
Yolks only	2	34	120	6	*t*	0	10	8
OILS, FATS, AND SHORTENINGS								
Butter	1 T.	14	100	*t*	*t*	0	11	10
Butter	½ cup or ¼ lb.	112	800	*t*	1	0	90	80
Hydrogenated cooking fat	½ cup	100	665	0	0	0	100	88
Lard	½ cup	110	992	0	0	0	110	92
Margarine, ¼ pound or	½ cup	112	806	*t*	*t*	0	91	76
Margarine, 2 pats or	1 T.	14	100	*t*	*t*	0	11	9
Mayonnaise	1 T.	15	110	*t*	*t*	0	12	5
Oils								
Corn, soy, peanut,‡ cottonseed	1 T.	14	125	0	0	0	14	5

	MINERALS					VITAMINS				
Linoleic acid gr.	*Iron mg.*	*Calcium mg.*	*Phosphorus mg.*	*Potassium mg.*	*Sodium mg.*	*A units*	B_1 *mg.*	B_2 *mg.*	*Niacin mg.*	*C mg.*
1	0	82	70	65	50	1,900	*t*	.1	*t*	*t*
t	.9	207	360	170	625	430	.1	.6	.2	0
t	.9	202	380	180	620	20	.1	.6	.1	0
t	.1	133	128	30	180	230	*t*	.1	*t*	0
t	.6	435	390	90	540	700	*t*	.2	*t*	0
t	.1	18	170	25	180	440	*t*	.1	*t*	0
t	.1	210	190	22	370	350	*t*	.1	*t*	0
t	.2	122	100	22	284	350	*t*	.2	.1	0
t	.2	270	140	25	225	320	*t*	.1	*t*	0
1	2.3	54	205	129	122	1,180	*t*	.3	*t*	0
1	2.2	60	222	140	338	1,200	*t*	.4	*t*	0
1	1.8	48	175	33	9	1,180	*t*	.1	*t*	0
t	*t*	3	0	4	120	460	0	*t*†	0	0
2	*t*	22	0	28	990	3,700	0	*t*	0	0
7	0	0	0	0	4	0	0	0	0	0
11	0	0	0	*t*	*t*	0	0	0	0	0
8	0	22	16	58	1,150	3,700	0	*t*	0	0
1	0	3	2	9	144	460	0	0	0	0
6	.1	2	8	3	85	40	*t*	*t*	*t*	0
7	0	0	0	0	0	0	0	0	0	0

* Includes oleic acid

t Indicates trace only

† Contains less than .1 milligram

‡ Richest source of arachidonic acid

FOOD	Approximate Measure	Wgt. in gr.	Calories	Protein gr.	Carbohydrate gr.	Fiber gr.	Fat gr.	Saturated fatty acid* gr.
OILS, FATS, AND SHORTENINGS (*Continued*)								
Olive	1 T.	14	125	0	0	0	14	13
Safflower, sunflower seed, walnut	1 T.	14	125	0	0	0	14	3
Salad dressing								
French	1 T.	15	60	*t*	2	0	6	2
Thousand Island	1 T.	15	75	*t*	1	0	8	3
Salt pork	2 oz.	60	470	3	0	0	55	—
MEAT AND POULTRY, COOKED								
Bacon, crisp, drained	2 slices	16	95	4	1	0	8	7
Beef, chuck, pot-roasted	3 oz.	85	245	23	0	0	16	15
Hamburger, commercial	3 oz.	85	245	21	0	0	17	15
Ground lean	3 oz.	85	185	24	0	0	10	9
Roast, oven cooked	3 oz.	85	390	16	0	0	36	35
Steak, as sirloin	3 oz.	85	330	20	0	0	27	25
Steak, lean, as round	3 oz.	85	220	24	0	0	12	11
Corned beef	3 oz.	85	185	22	0	0	10	9
Corned beef hash, canned	3 oz.	85	120	12	6	*t*	8	7
Dried or chipped	2 oz.	56	115	19	0	0	4	4
Pot-pie, 4½-in. diam.	1 pie	227	460	18	32	*t*	28	25
Stew, with vegetables	1 cup	235	185	15	15	*t*	10	9
Chicken, broiled	3 oz.	85	185	23	0	0	9	7
Fried, breast or leg and thigh	3 oz.	85	245	25	0	0	15	11
Chicken livers, fried	3 med.	100	140	22	2.3	0	14	12
Chicken, roasted	3½ oz.	100	290	25	0	0	20	16
Duck, domestic	3½ oz.	100	370	16	0	0	28	—

Linoleic acid gr.	MINERALS					VITAMINS				
	Iron mg.	Calcium mg.	Phosphorus mg.	Potassium mg.	Sodium mg.	A units	B_1 mg.	B_2 mg.	Niacin mg.	C mg.
1	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0
3	.1	3	0	0	—	0	0	0	0	0
4	.1	2	t	—	—	60	t	t	t	0
—	.4	t	t	19	1,350	0	t	t	t	0
1	.5	2	42	65	600	0	t	t	.8	0
t	2.9	10	110	340	50	30	t	.18	3.5	0
t	2.7	9	145	320	100	30	t	t	5.1	0
t	3	10	158	340	110	20	t	t	5.3	0
t	2.1	7	105	350	60	60	t	t	3	0
1	2.5	8	150	320	60	50	t	t	4	0
t	3	11	180	300	62	20	t	t	4.8	0
t	3.7	17	100	60	1,200	20	t	.2	2.9	0
t	1.1	20	125	180	540	10	t	.1	2.4	0
0	2.9	10	60	190	30	t	t	.2	2.2	0
1	2.5	20	150	318	620	2,800	t	.1	3	t
t	2.8	30	150	500	75	2,500	.1	.2	4.4	14
2	1.4	10	250	350	50	260	t	.1	7	0
2	1.8	13	218	320	50	200	t	.1	5	0
2	7.4	16	240	160	51	32,200	.2	2.4	11.8	20
4	1.9	10	220	280	58	960	t	.2	7.4	0
—	2.4	9	170	285	74	—	t	.4	7.9	0

* Includes oleic acid   t Indicates trace only   — No data available

FOOD	*Approximate Measure*	*Wgt. in gr.*	*Calories*	*Protein gr.*	*Carbohydrate gr.*	*Fiber gr.*	*Fat gr.*	*Saturated fatty acid* gr.*
MEAT AND POULTRY, COOKED (*Continued*)								
Lamb, chop, broiled	4 oz.	115	480	24	0	0	35	33
Leg, roasted	3 oz.	86	314	20	0	0	14	14
Shoulder, braised	3 oz.	85	285	18	0	0	23	21
Pork chop, 1 thick	3½ oz.	100	260	16	0	0	21	18
Ham, cured, pan-broiled	3 oz.	85	290	16	0	0	22	19
Ham, as luncheon meat	2 oz.	57	170	13	0	0	13	11
Ham, canned, spiced	2 oz.	57	165	8	1	0	14	12
Pork roast	3 oz.	85	310	21	0	0	24	21
Pork sausage, bulk	3½ oz.	100	475	18	0	0	44	40
Turkey, roasted	3½ oz.	100	265	27	0	0	15	—
Veal cutlet, broiled	3 oz.	85	185	23	0	0	9	8
Roast	3 oz.	85	305	23	0	0	14	13
VARIETY MEATS								
Brains, beef, calf, pork, sheep	3½ oz.	100	125	10	0	0	8	—
Chili con carne with beans	1 cup	250	325	19	30	1.2	15	14
Without beans	1 cup	255	510	26	15	*t*	38	36
Heart, braised	3 oz.	85	160	26	1	0	5	4
Kidney, braised	3½ oz.	100	230	33	1	0	7	—
Liver, beef, sautéed with oil	3½ oz.	100	230	26	5	0	10	7
Calf, 1 large slice	3½ oz.	100	261	29	4	0	13	—
Lamb, 2 slices	3½ oz.	100	260	32	3	0	12	—
Pork, 2 slices	3½ oz.	100	241	29	3	0	11	—
Liver, desiccated see Supplementary foods								
Sausage, bologna	2 slices, ⅛ × 4"	50	124	7	2	*t*	10	9

	MINERALS					VITAMINS				
Linoleic acid gr.	*Iron mg.*	*Calcium mg.*	*Phosphorus mg.*	*Potassium mg.*	*Sodium mg.*	*A units*	*B_1 mg.*	*B_2 mg.*	*Niacin mg.*	*C mg.*
1	3.1	10	140	275	75	0	.1	.2	4.5	0
0	2.8	9	190	270	70	0	.1	.2	5	0
1	2.4	8	170	260	60	0	.1	.2	4	0
2	2.2	8	250	390	30	0	.6	.2	3.8	0
2	2.2	8	240	370	1,000	0	.4	.1	3	0
1	1.5	5	170	290	700	0	.2	.1	1.6	0
1	1.2	5	170	280	800	0	.2	.1	1.8	0
2	2.7	9	240	360	40	0	.8	.2	4.4	0
3	2.4	7	165	270	958	0	.8	.3	3.7	0
—	3.8	23	320	320	60	0	*t*	.1	8	0
t	2.7	9	230	400	70	0	*t*	.2	6	0
t	2.9	10	200	390	70	0	.1	.3	6.6	0
—	2.4	10	312	219	125	0	.2	.2	4.4	0
t	4.2	98	360	500	1,060	100	*t*	.2	3.5	0
1	5.9	14	365	520	1,000	130	*t*	.3	5.6	0
t	6	14	203	190	90	30	.2	1	6.8	—
—	13.1	18	220	320	250	1,150	.5	4.8	10.7	0
2	9	8	476	380	184	53,400	.3	4.1	16.5	27
—	14.2	13	537	453	118	32,000	.2	4.2	16.5	37
—	17.9	16	572	330	85	74,000	.5	5.1	24.9	36
—	29	15	539	390	111	14,000	.3	4.4	22.3	22
t	1.2	4	54	110	550	0	*t*	*t*	1.3	0

* Includes oleic acid *t* Indicates trace only — No data available

FOOD	*Approximate Measure*	*Wgt. in gr.*	*Calories*	*Protein gr.*	*Carbohydrate gr.*	*Fiber gr.*	*Fat gr.*	*Saturated fatty acid* gr.*
VARIETY MEATS (*Continued*)								
Frankfurter	2, ¾ × 7″	102	246	14	2	*t*	20	18
Liverwurst	2 oz.	56	132	8	1	0	11	—
Sweetbreads, braised, calf	3½ oz.	100	170	32	0	0	3	—
Tongue, beef	3 oz.	85	205	18	*t*	0	14	13
FISH AND SEAFOODS								
Clams, steamed or canned	3 oz.	85	87	12	2	0	1	—
Cod, broiled	3½ oz.	100	170	28	0	0	5	0
Codfish cakes, fried	2 small	100	175	15	9	—	8	—
Crabmeat, cooked	3 oz.	85	90	14	1	0	2	0
Fish sticks, breaded, fried	5	112	200	19	8	0	10	5
Flounder, baked	3½ oz.	100	200	30	0	0	8	0
Haddock, fried	3 oz.	85	135	16	6	0	5	4
Halibut, broiled	3½ oz.	100	182	26	0	0	8	0
Herring, kippered	1 small	100	211	22	0	0	13	0
Lobster, steamed	½ aver.	100	92	18	*t*	0	1	0
Mackerel, canned	3 oz.	85	155	18	0	0	9	0
Oysters, raw	6-8 med. or ½ cup	120	85	8	3	0	2	0
Oyster stew, made with milk	1 cup	230	200	11	11	0	12	—
Salmon, canned	3 oz.	85	120	17	0	0	5	1
Sardines, canned	3 oz.	85	180	22	0	0	9	4
Scallops, breaded, fried	3½ oz	100	194	18	10	0	8	—
Shad, baked	3 oz.	85	170	20	0	0	10	0
Shrimp, steamed	3 oz.	85	110	23	0	0	1	0
Swordfish, broiled	1 steak	100	180	27	0	0	6	0
Tuna, canned, drained	3 oz.	85	170	25	0	0	7	3

	MINERALS					VITAMINS				
Linoleic acid gr.	*Iron mg.*	*Calcium mg.*	*Phosphorus mg.*	*Potassium mg.*	*Sodium mg.*	*A units*	*B_1 mg.*	*B_2 mg.*	*Niacin mg.*	*C mg.*
1	1.2	6	50	215	1,100	0	.1	.2	2.5	0
—	2.8	4	120	75	450	2,860	.2	.6	2.3	0
—	.8	7	360	244	116	0	.1	.3	5	0
t	2.5	7	180	240	90	0	*t*	.3	3	0
—	5.4	74	110	230	170	100	*t*	*t*	.9	0
—	1	30	270	400	110	180	*t*	.1	3	0
—	—	—	—	—	—	—	—	—	—	0
0	.8	38	170	100	900	—	*t*	*t*	2.1	0
5	.4	12	180	140	—	*t*	0	*t*	1.6	0
—	1.4	22	344	585	235	0	*t*	*t*	2.5	0
t	.7	11	200	510	56	0	*t*	*t*	2.6	0
0	.8	14	267	540	56	440	*t*	*t*	9.2	0
0	1.4	66	254	—	—	110	*t*	.1	3.4	0
0	.6	65	192	180	210	0	.1	*t*	1.9	0
0	1.9	221	260	—	—	20	*t*	.3	7.4	0
0	6.6	113	150	120	80	320	.2	.2	3.3	0
—	3.3	269	230	310	940	640	.1	.4	1.7	0
0	.7	160	280	340	45	60	*t*	.2	6.8	0
4	2.5	367	490	540	480	190	*t*	.2	4.6	0
—	1.4	110	338	470	265	0	*t*	.1	1.4	0
0	.5	20	300	350	75	20	.1	.2	7.3	0
0	2.6	98	250	205	130	50	*t*	*t*	1.9	0
0	1.1	20	250	780	51	2,000	*t*	*t*	10.3	0
4	1.2	7	300	240	700	70	*t*	.1	10.9	0

* Includes oleic acid   *t* Indicates trace only   — No data available

FOOD	*Approximate Measure*	*Wgt. in gr.*	*Calories*	*Protein gr.*	*Carbohydrate gr.*	*Fiber gr.*	*Fat gr.*	*Saturated fatty acid* gr.*
VEGETABLES								
Artichoke, globe	1 large	100	8-44	2	10†	2	*t*	*t*
Asparagus, green	6 spears	96	18	1	3	.5	*t*	*t*
Beans, green snap	1 cup	125	25	1	6	.6	*t*	*t*
Lima, green	1 cup	160	140	8	24	3	*t*	*t*
Lima, dry, cooked	1 cup	192	260	16	48	2	*t*	*t*
Navy, baked with pork	¾ cup	200	250	11	37	2	6	6
Red kidney, canned	1 cup	260	230	15	42	2.5	1	0
Bean sprouts, uncooked	1 cup	50	17	1	3	.3	*t*	0
Beet greens, steamed	1 cup	100	27	2	6	1.4	*t*	0
Beetroots, boiled	1 cup	165	68	1	12	.8	*t*	0
Broccoli, steamed	1 cup	150	45	5	8	1.9	*t*	0
Brussels sprouts, steamed	1 cup	130	60	6	12	1.7	*t*	0
Cabbage, as coleslaw‡	1 cup	120	140	1	9	1	14	4
Sauerkraut, canned	1 cup	150	32	1	7	1.5	*t*	0
Steamed cabbage	1 cup	170	40	2	9	1.3	*t*	0
Carrots, cooked, diced	1 cup	150	45	1	10	.9	*t*	0
Raw, grated	1 cup	110	45	1	10	1.2	*t*	0
Strips, from raw	1 med.	50	20	*t*	5	.5	*t*	0
Cauliflower, steamed	1 cup	120	30	3	6	1	*t*	0
Celery, cooked, diced	1 cup	100	20	1	4	1	*t*	0
Stalk, raw	1 large	40	5	1	1	.3	*t*	0
Chard, steamed, leaves and stalks	1 cup	150	30	2	7	1.4	*t*	0
Collards, steamed leaves	1 cup	150	51	5	8	2	*t*	0
Corn, steamed	1 ear	100	92	3	21	.8	1	*t*
Cooked or canned	1 cup	200	170	5	41	1.6	*t*	0

	MINERALS					VITAMINS				
Linoleic acid gr.	Iron mg.	Calcium mg.	Phosphorus mg.	Potassium mg.	Sodium mg.	A units	B_1 mg.	B_2 mg.	Niacin mg.	C mg.
0	1.3	50	69	300	30	150	t	t	.7	8
0	1.7	18	43	130	3	700	t	t	.9	18
0	.9	45	20	204	2	830	t	.1	.6	16
0	2.5	44	105	320	2	290	.2	.1	1.9	15
0	1.5	15	75	306	1	t	.3	.1	1.3	0
0	4.2	112	226	420	960	t	.1	.1	1.3	t
t	4.6	74	350	750	6	0	.1	.1	1.5	0
t	3.8	19	170	514	3	40	.2	.1	1.3	t
t	3.2	118	45	332	76	5,100	t	.1	.3	30
t	1	24	44	324	64	30	t	t	.5	10
t	2.1	190	100	405	15	5,100	t	.2	1.2	105
t	1.7	44	95	400	14	520	t	.1	.6	60
9	.5	47	30	240	150	80	t	t	.3	50
t	.8	54	45	210	915	0	t	.1	.2	24
t	.8	78	50	240	23	150	t	t	.3	53
t	.9	38	55	600	75	18,130	t	t	.7	6
t	.9	43	29	410	51	13,000	t	t	.7	7
t	.4	20	19	205	25	5,000	t	t	.3	3
t	1.2	26	84	220	11	100	t	.1	.6	34
t	.5	54	40	300	80	0	t	t	.4	7
t	.2	20	18	130	30	0	t	t	.2	3
t	3.6	155	54	475	120	8,100	t	.1	.1	17
t	1.2	282	75	393	40	11,700	t	.2	1.6	75
t	.5	4	120	300	t	300	t	t	1.1	12
t	1.3	10	102	400	472§	520	t	.1	2.4	14

* Includes oleic acid

t Indicates trace only

§ Salted

† Largely inulin, which is not utilized in the body

‡ With mayonnaise

FOOD	*Approximate Measure*	*Wgt. in gr.*	*Calories*	*Protein gr.*	*Carbohydrate gr.*	*Fiber gr.*	*Fat gr.*	*Saturated fatty acid* gr.*
VEGETABLES (*Continued*)								
Cucumbers, ⅛" slices	6	50	6	*t*	1	.2	0	0
Dandelion greens, steamed	1 cup	180	80	5	16	3.2	1	0
Eggplant, steamed	1 cup	180	30	2	9	1.2	*t*	0
Endive (escarole)	2 oz.	57	10	1	2	.6	*t*	—
Kale, steamed	1 cup	110	45	4	8	.9	1	—
Kohlrabi, raw, sliced	1 cup	140	40	2	9	1.5	*t*	—
Lamb's-quarters, steamed	1 cup	150	48	5	7	3.2	*t*	—
Lentils	1 cup	200	212	15	38	2.4	*t*	—
Lettuce, loose leaf, green	¼ head	100	14	1	2	.5	*t*	—
Iceberg	¼ head	100	13	*t*	3	.5	*t*	—
Mushrooms, cooked or canned	½ cup	120	12	2	4	*t*	*t*	—
Mustard greens, steamed	1 cup	140	30	3	6	1.2	*t*	—
Okra, diced, steamed	1⅓ cup	100	32	1	7	1	*t*	—
Onions, mature, cooked	1 cup	210	80	2	18	1.6	*t*	—
Raw, green	6 small	50	22	*t*	5	1	*t*	—
Parsley, chopped, raw	2 T.	7	2	*t*	*t*	*t*	*t*	—
Parsnips, steamed	1 cup	155	95	2	22	3	1	—
Peas, green, canned	1 cup	100	68	3	13	1.4	*t*	—
Fresh, steamed	1 cup	100	70	5	12	2.2	*t*	—
Frozen, heated	1 cup	100	68	5	12	1.8	*t*	—
Split, cooked	½ cup	100	115	8	21	.4	*t*	—
With carrots, frozen, heated	1 cup	100	53	3	10	1	*t*	—
Peppers, pimientos, canned	1 pod	38	10	*t*	2	*t*	*t*	—
Raw, green, sweet	1 large	100	25	1	6	1.4	*t*	—

Linoleic acid gr.	MINERALS					VITAMINS				
	Iron mg.	Calcium mg.	Phosphorus mg.	Potassium mg.	Sodium mg.	A units	B_1 mg.	B_2 mg.	Niacin mg.	C mg.
0	.1	5	9	80	3	0	*t*	*t*	.1	4
t	5.6	337	126	760	130	27,300	.3	.2	1.3	29
t	.9	17	60	390	2	10	*t*	*t*	.9	8
—	1	45	28	215	9	1,700	*t*	*t*	.1	6
—	1.3	130	57	260	29	8,000	*t*	.2	.8	60
—	.8	66	70	520	10	*t*	*t*	*t*	.3	85
—	1	460	100	—	—	14,650	.1	.4	1.4	120
—	4.1	50	238	505	15	40	*t*	*t*	1.2	0
—	2	35	26	260	9	1,900	*t*	*t*	.3	18
—	.5	20	22	175	9	300	*t*	*t*	.3	6
—	.9	8	105	180	400†	0	*t*	.3	3	3
—	4.1	308	60	510	68	10,050	.1	.2	1	60
—	.7	82	62	370	1	740	*t*	*t*	.8	20
—	1	67	88	315	14	0	*t*	*t*	.4	10
—	.4	65	12	115	2	500	*t*	*t*	.2	16
—	.4	14	7	80	1	580	*t*	*t*	.2	14
—	1.1	88	120	570	11	0	*t*	.2	.3	19
—	1.8	25	67	96	270	500	.1	*t*	1	8
—	1.9	22	122	200	1	960	.3	.1	2.3	24
—	1.8	19	86	135	115	600	.2	*t*	1.7	13
—	1.7	11	89	296	13	40	.2	*t*	.9	0
—	1.1	25	57	160	84	9,000	.2	*t*	1.3	10
—	.7	9	10	50	*t*	800	.1	*t*	1.7	20
—	.4	11	25	170	*t*	370	*t*	*t*	.4	120

* Includes oleic acid

t Indicates trace only

— No data available

† Salted

FOOD	*Approximate Measure*	*Wgt. in gr.*	*Calories*	*Protein gr.*	*Carbohydrate gr.*	*Fiber gr.*	*Fat gr.*	*Saturated fatty acid* gr.*
VEGETABLES (*Continued*)								
Stuffed with beef and crumbs	1 med.	150	255	19	24	1	9	8
Potatoes, baked	1 med.	100	100	2	22	.5	*t*	—
French-fried	10 pieces	60	155	1	20	.4	7	3
Mashed with milk and butter	1 cup	200	230	4	28	.7	12	11
Potatoes, pan-fried	¾ cup	100	268	4	33	.4	14	6
Scalloped with cheese	¾ cup	100	145	6	14	.4	8	7
Steamed before peeling	1 med.	100	80	2	19	.4	*t*	—
Potato chips	10	20	110	1	10	*t*	7	4
Radishes, raw	5 small	50	10	*t*	2	.3	0	—
Rutabagas, diced	⅔ cup	100	32	*t*	8	1.4	0	0
Soybeans, unseasoned	1 cup	200	260	22	20	3.2	11	0
Spinach, steamed	1 cup	100	26	3	3	1	*t*	—
Squash, summer	1 cup	210	35	1	8	.6	*t*	—
Winter, mashed	1 cup	200	95	4	23	2.6	*t*	—
Sweet potatoes, baked	1 med.	110	155	2	36	1	1	—
Candied	1 med.	175	235	2	60	1.5	6	5
Tomatoes, canned whole	1 cup	240	50	2	9	1	*t*	—
Raw, 2 by 2½″	1 med.	150	30	1	6	.6	*t*	—
Tomato juice, canned	1 cup	240	50	2	10	.6	*t*	—
Tomato catsup	1 T.	17	15	*t*	4	*t*	*t*	—
Turnip greens, steamed	1 cup	145	45	4	8	1.8	1	—
Turnips, steamed, sliced	1 cup	155	40	1	9	1.8	*t*	—
Watercress, leaves and stems, raw	1 cup	50	9	1	1	.3	*t*	—

	MINERALS					VITAMINS				
Linoleic acid gr.	Iron mg.	Calcium mg.	Phosphorus mg.	Potassium mg.	Sodium mg.	A units	B_1 mg.	B_2 mg.	Niacin mg.	C mg.
t	3	60	180	387	420	420	.1	.2	3.5	60
—	.7	13	66	500	4	10	.1	*t*	1.2	15
4†	.7	9	6	510	6	0	*t*	*t*	1.8	8
t	1	45	150	654	660	470	.2	.1	1.6	16
8†	1.1	15	100	775	225	0	.1	*t*	2.8	20
t	.5	127	122	310	450	320	*t*	.1	.9	10
—	.8	11	56	407	3	10	.1	*t*	1.2	15
3†	.4	6	38	210	200	*t*	*t*	*t*	.6	0
—	.5	5	53	130	4	15	*t*	*t*	.1	12
0	.4	40	35	170	4	350	*t*	*t*	.7	21
7	5.4	150	360	1,080	4	60	.4	.1	1.2	0
—	.2	124	33	470	74	11,800	.1	.2	.6	30
—	.8	8	32	480	8	700	*t*	.1	1.3	24
—	1.6	23	49	510	2	6,100	*t*	.1	.6	7
—	1	36	58	300	12	8,900	.1	*t*	.7	24
1	1.6	50	70	360	18	11,600	.1	.1	1.1	30
—	1.5	27	44	552	18	2,500	.1	*t*	1.7	40
—	.9	16	40	360	5	2,600	*t*	*t*	.8	35
—	1	17	80	540	36	2,500	.1	*t*	1.8	38
—	.1	2	3	160	260	300	*t*	*t*	.4	2
—	3.5	375	75	—	—	15,300	.1	.6	1	90
—	.8	62	51	345	87	*t*	*t*	*t*	.6	28
—	.8	75	27	140	25	2,500	*t*	1	.4	80

* Includes oleic acid

t Indicates trace only

— No data available

† If fried in oil

FOOD	*Approximate Measure*	*Wgt. in gr.*	*Calories*	*Protein gr.*	*Carbohydrate gr.*	*Fiber gr.*	*Fat gr.*	*Saturated fatty acid* gr.*
FRUITS								
Apple juice, fresh or canned	1 cup	250	125	*t*	34	—	0	0
Apple vinegar	⅓ cup	100	14	*t*	3	0	0	0
Apples, raw	1 med.	130	70	*t*	18	1	*t*	—
Stewed or canned	1 cup	240	100†	*t*	26	2	*t*	—
Apricots, canned in syrup	1 cup	250	220	2	57	1	*t*	—
Dried, uncooked	½ cup	75	220	4	50	1	*t*	—
Fresh	3 med.	114	55	1	14	.7	*t*	—
Nectar, or juice	1 cup	250	140	1	36	2	*t*	—
Avocado	½ large	108	185	2	6	1.8	18	12
Banana	1 med.	150	85	1	23	.9	*t*	—
Blackberries, fresh	1 cup	144	85	2	19	6.6	1	—
Blueberries, canned	1 cup	250	245	1	65	2	*t*	—
Cantaloupe	½ med.	380	40	1	9	2.2	*t*	—
Cherries, canned, pitted†	1 cup	257	100	2	26	2	1	—
Fresh, raw	1 cup	114	65	1	15	.3	*t*	—
Cranberry sauce, sweetened	1 cup	277	530	*t*	142	1.2	*t*	—
Dates, dried	1 cup	178	505	4	134	3.6	*t*	—
Figs, dried, large, 2 by 1″	2	42	120	2	30	1.9	*t*	—
Fresh, raw	3 med.	114	90	2	22	1	*t*	—
Stewed or canned, with syrup	3	115	130	1	32	1	*t*	—
Fruit cocktail, canned	1 cup	256	195	1	50	.5	*t*	—
Grapefruit, canned sections	1 cup	250	170	1	44	.5	*t*	—
Grapefruit, fresh, 5″ diameter	½	285	50	1	14	1	*t*	*t*
Grapefruit juice†	1 cup	250	100	1	24	1	*t*	—

Linoleic acid gr.	MINERALS					VITAMINS				
	Iron mg.	Calcium mg.	Phosphorus mg.	Potassium mg.	Sodium mg.	A units	B_1 mg.	B_2 mg.	Niacin mg.	C mg.
0	1.2	15	12	200	5	90	*t*	*t*	*t*	2
0	.6	6	9	100	1	0	0	0	0	0
—	.4	8	13	130	1	50	*t*	*t*	*t*	3
—	1	10	12	210	4	80	*t*	*t*	.1	3
—	8	28	37	600	2	4,500	*t*	*t*	.9	10
—	4.1	50	75	780	19	8,000	*t*	.1	3	9
—	.5	18	30	280	1	2,900	*t*	*t*	.7	10
—	.5	22	30	440	*t*	2,300	*t*	*t*	.5	7
2	.6	11	42	600	4	310	.1	.2	1.7	15
—	.7	8	44	390	1	190	*t*	*t*	.7	10
—	1.3	46	46	220	*t*	290	*t*	*t*	.5	30
—	.5	100	15	200	2	100	*t*	*t*	.2	30
—	.8	33	64	910	40	6,000	*t*	*t*	1	65
—	.7	37	30	135	8	1,680	*t*	*t*	.4	13
—	.4	18	20	270	1	620	*t*	*t*	.4	10
—	.8	34	27	150	3	80	*t*	*t*	.3	5
—	5.7	105	110	1,300	1	100	.1	.2	3.9	0
—	1.7	80	55	390	15	40	.1	*t*	.8	0
—	.4	35	20	110	1	90	*t*	*t*	.6	2
—	.4	36	21	105	1	50	*t*	*t*	.4	0
—	1	23	30	350	12	360	*t*	*t*	1	5
—	.7	32	35	237	2	20	*t*	*t*	.5	75
0	.5	21	54	290	4	10	*t*	*t*	.3	72
—	1	20	40	280	2	20	*t*	*t*	.4	84

* Includes oleic acid
t Indicates trace only

— No data available
† Unsweetened

FOOD	Approximate Measure	Wgt. in gr.	Calories	Protein gr.	Carbohydrate gr.	Fiber gr.	Fat gr.	Saturated fatty acid* gr.
FRUITS (*Continued*)								
Grapes, American, as Concord	1 cup	153	70	1	16	.8	*t*	—
European, as Muscat, Tokay	1 cup	160	100	1	26	.7	*t*	—
Grape juice, bottled	1 cup	250	160	1	42	*t*	*t*	—
Lemon juice, fresh	½ cup	125	30	*t*	10	*t*	*t*	—
Lemonade concentrate, frozen	6-oz. can	220	430	*t*	112	*t*	*t*	—
Limeade concentrate, frozen	6-oz. can	218	405	*t*	108	*t*	*t*	—
Olives, green, canned, large	10	65	72	1	3	.8	10	9
Ripe, canned, large	10	65	105	1	1	1	13	12
Oranges, fresh, 3" diameter	1 med.	180	60	2	16	1	*t*	*t*
Orange juice, fresh	8 oz. or 1 glass	250	112	2	25	.2	*t*	—
Juice, frozen concentrate	6-oz. can	210	330	2	78	.4	*t*	*t*
Papaya, fresh	½ med.	200	75	1	18	1.8	*t*	—
Peaches, canned, sliced	1 cup	257	200	1	52	1	*t*	—
Fresh, raw	1 med.	114	35	1	10	.6	*t*	—
Pears, canned, sweetened	1 cup	255	195	1	50	2	*t*	—
Raw, 3 by 2½"	1 med.	182	100	1	25	2	1	—
Persimmons, Japanese	1 med.	125	75	1	20	2	*t*	—
Pineapple, canned, sliced	1 large slice	122	95	*t*	26	.4	*t*	—
Crushed	1 cup	260	205	1	55	.7	*t*	—
Raw, diced	1 cup	140	75	1	19	.6	*t*	—
Pineapple juice, canned‡	1 cup	250	120	1	32	.2	*t*	—

Linoleic acid gr.	MINERALS Iron mg.	Calcium mg.	Phosphorus mg.	Potassium mg.	Sodium mg.	VITAMINS A units	B_1 mg.	B_2 mg.	Niacin mg.	C mg.
—	.4	13	30	120	5	100	*t*	*t*	.3	4
—	.6	18	30	240	6	120	*t*	*t*	.4	7
—	.8	28	33	450	1	*t*	.1	*t*	.6	*t*
—	.2	8	13	80	4	20	*t*	*t*	.1	50
—	.4	9	15	170	5	40	*t*	*t*	.7	66
—	.7	11	12	118	*t*	*t*	*t*	*t*	.2	260
t	1.2	65	13	45	1,400	200	*t*	0	0	0
t	1.1	56	11	23	650	60	*t*	*t*	0	0
—	.5	50	40	300	*t*	240	1	*t*	.3	75
—	.5	27	42	500	2	500	.2	*t*	1	129
—	.8	69	115	1,315	4	1,490	.6	.1	2.4	330
—	.5	40	32	470	6	3,500	*t*	*t*	.6	112
—	.8	11	35	310	6	1,100	*t*	*t*	1.4	7
—	.5	9	22	31	5	1,320†	*t*	*t*	1	7
—	.5	13	30	75	12	*t*	*t*	*t*	.3	4
—	.5	13	29	182	3	30	*t*	*t*	.2	7
—	.4	7	28	310	1	2,710	*t*	*t*	.1	11
—	.7	26	9	150	1	100	.1	*t*	.2	11
—	1.6	75	15	140	2	210	.2	*t*	.4	23
—	.4	22	12	210	1	180	.1	*t*	.3	33
—	1.2	37	22	370	2	200	.1	*t*	.4	22

* Includes oleic acid
t Indicates trace only
— No data available

† If yellow only
‡ Unsweetened

FOOD	Approximate Measure	Wgt. in gr.	Calories	Protein gr.	Carbohydrate gr.	Fiber gr.	Fat gr.	Saturated fatty acid* gr.
FRUITS (*Continued*)								
Plums, canned in syrup	1 cup	256	185	1	50	.7	*t*	—
Raw, 2″ diameter	1	60	30	*t*	7	.2	*t*	—
Prunes, cooked†	1 cup	270	300	3	81	.8	1	—
Prune juice, canned†	1 cup	240	170	1	45	.7	*t*	—
Raisins, dried	½ cup	80	230	2	62	.7	*t*	—
Raspberries, frozen	½ cup	100	100	*t*	25	2	*t*	—
Raw,† red	¾ cup	100	57	*t*	14	5	*t*	—
Rhubarb, cooked, sweetened	1 cup	270	385	1	98	1.9	*t*	—
Strawberries, frozen	1 cup	227	242	1	60	1.3	*t*	—
Raw†	1 cup	149	54	*t*	12	1.9	*t*	—
Tangerines, fresh	1 med.	114	40	1	10	1	*t*	—
Watermelon, 4 by 8″	1 wedge	925	120	2	29	3.6	1	—
BREADS, CEREALS, GRAINS, AND GRAIN PRODUCTS								
Biscuits, 2½″ diameter‡	1	38	130	3	18	*t*	4	3
Bran flakes	1 cup	25	117	3	32	1.3	*t*	—
Bread, cracked wheat	1 slice	23	60	2	12	.1	1	1
Rye	1 slice	23	55	2	12	.1	*t*	*t*
White,§ 20 slices, or a	1-lb. loaf‖	454	1,225	39	229	9	15	12
Whole-wheat	1-lb. loaf	454	1,100	48	216	67.5	14	10
Whole-wheat	1 slice	23	55	2	11	.3	1	—
Cold cereal, home prepared¶	1 cup	100	545	15	53	20	33	12
Corn bread	1 serving	50	100	3	15	.3	4	2
Cornflakes†	1 cup	25	110	2	25	.1	*t*	—
Corn grits, cooked	1 cup	242	120	3	27	.2	*t*	—
Corn meal, yellow	1 cup	118	360	9	74	1.6	4	2

Linoleic acid gr.	MINERALS					VITAMINS				
	Iron mg.	Calcium mg.	Phosphorus mg.	Potassium mg.	Sodium mg.	A units	B_1 mg.	B_2 mg.	Niacin mg.	C mg.
—	2.7	20	25	213	2	260	*t*	*t*	.9	3
—	.3	10	10	100	*t*	200	*t*	*t*	.3	3
—	4.5	60	100	810	10	1,800	*t*	.2	1.8	3
—	9.8	34	100	625	5	—	*t*	*t*	1.1	4
—	2.8	50	112	575	19	15	.1	*t*	.4	0
—	.6	12	17	95	*t*	80	*t*	*t*	.6	20
—	.9	40	37	190	*t*	130	*t*	*t*	.3	24
—	1.1	112	39	510	15	70	*t*	0	.2	17
—	1.3	50	34	220	3	80	*t*	.1	.4	93
—	1.2	20	24	157	2	50	*t*	*t*	.5	60
—	.4	33	23	110	2	420	*t*	*t*	.2	30
—	1.2	63	96	600	2	520	*t*	*t*	.2	6
t	.7	61	58	40	208	0	*t*	*t*	.7	0
—	2	25	248	480	960	0	.1	.1	3.4	0
0	.4	16	25	50	125	0	*t*	*t*	.3	0
0	.4	17	29	52	120	0	*t*	*t*	.3	0
2	10.9	318	662	720	2,655	0	1.1	.7	10.4	0
4	10.4	449	1,083	810	2,880	0	1.2	1	12.9	0
—	.5	23	54	40	144	0	*t*	*t*	.7	0
12	4.5	290	500	500	10	12	.7	.8	.2	.3
2	1.1	60	205	75	314	100	*t*	*t*	.3	0
—	1.2	6	15	40	165	0	.1	*t*	.6	0
—	.7	2	24	200	2	*t*	*t*	*t*	.4	0
2	1.8	6	178	284	1	500	.4	.1	2	0

* Includes oleic acid
t Indicates trace only
— No data available
† Unsweetened
‡ Made with refined flour
§ "Enriched" with vitamins B_1, B_2, niacin, and iron
‖ Contains 4% milk solids
¶ Recipe on p. 297

FOOD	*Approximate Measure*	*Wgt. in gr.*	*Calories*	*Protein gr.*	*Carbohydrate gr.*	*Fiber gr.*	*Fat gr.*	*Saturated fatty acid* gr.*
BREADS, CEREALS, GRAINS, AND GRAIN PRODUCTS (*Continued*)								
Crackers, graham	2 med.	14	55	1	10	*t*	1	—
Soda, 2½" square	2	11	45	1	8	*t*	1	—
Farina†	1 cup	238	105	3	22	0	*t*	—
Flour, soy, full fat	1 cup	110	460	39	33	2.9	22	0
Wheat, all purpose†	1 cup	110	400	12	84	.3	1	—
Wheat, whole	1 cup	120	390	13	79	2.8	2	—
Macaroni, cooked	1 cup	140	155	5	32	.1	1	—
Baked with cheese	1 cup	220	475	18	44	*t*	25	24
Muffins of refined flour†	1	48	135	4	19	*t*	5	4
Noodles	1 cup	160	200	7	37	.1	2	2
Oatmeal, or rolled oats	1 cup	236	150	5	26	4.6	3	2
Pancakes, buckwheat, 4" diam.	4	108	192	7	21	.5	8	—
Wheat, refined flour,† 4" diam.	4	108	250	7	28	.1	9	—
Pizza, cheese, ⅛ of 14" diam.	1 section	75	180	8	23	*t*	6	5
Popcorn, with oil and salt	2 cups	28	152	3	20	.6	7	2
Puffed rice†	1 cup	14	55	*t*	12	*t*	*t*	—
Puffed wheat,† presweetened	1 cup	28	105	1	26	.6	*t*	—
Rice, brown	1 cup	208	748	15	154	1.2	3	—
Converted	1 cup	187	677	14	142	.4	*t*	—
White†	1 cup	191	692	14	150	.3	*t*	—
Rice flakes†	1 cup	30	115	2	26	.1	*t*	—
Rice polish	½ cup	50	132	6	28	1.2	6	—
Rolls, breakfast, sweet	1 large	50	411	3	23	.1	12	11
Of refined flour†	1	38	115	3	20	*t*	2	2
Whole-wheat	1	40	102	4	20	.1	1	—

Linoleic acid gr.	MINERALS					VITAMINS				
	Iron mg.	Calcium mg.	Phosphorus mg.	Potassium mg.	Sodium mg.	A units	B_1 mg.	B_2 mg.	Niacin mg.	C mg.
—	.3	3	56	45	90	0	*t*	*t*	.2	0
—	.1	2	19	12	110	0	*t*	*t*	.1	0
—	.8	31	29	20	33	0	.1	*t*	1	0
11	8.8	218	613	1,826	1	121	.9	.3	2.3	0
—	3.2	18	87	86	1	0	.4	.2	3.2	0
—	3.9	49	464	445	3	0	.6	.2	5.1	0
—	.6	11	82	276	1	0	*t*	*t*	.4	0
1	2	394	363	132	1,192	970	.2	.5	1.9	0
t	.7	74	80	62	221	60	*t*	.1	.7	0
t	1	16	52	—	—	60	*t*	*t*	.7	0
1	1.7	21	140	142	508	0	.2	*t*	.4	0
—	1.2	249	360	245	464	230	.1	.2	.7	0
—	1.3	158	159	135	470	110	.1	.1	.9	0
t	.7	157	147	96	525	570	*t*	.1	.8	8
4	.8	4	90	—	646	0	*t*	*t*	.7	0
—	.3	2	82	57	*t*	0	*t*	*t*	.6	0
—	.5	4	38	110	180	0	.1	*t*	1.4	0
—	4	78	608	310	18	0	.6	.1	9.2	0
—	1.6	53	244	300	6	0	.3	*t*	7.6	0
—	1.6	46	258	247	4	0	*t*	*t*	1.6	0
—	.5	9	44	60	329	0	.1	*t*	1.7	0
—	8	35	553	357	*t*	0	.9	.2	14	0
t	.4	42	54	56	185	70	*t*	*t*	.8	0
0	.7	28	39	34	202	*t*	.1	*t*	.8	0
—	1	46	112	100	225	0	.1	.1	1.5	0

* Includes oleic acid

t Indicates trace only

— No data available

† "Enriched" with vitamins B_1, B_2, niacin, and iron

FOOD	*Approximate Measure*	*Wgt. in gr.*	*Calories*	*Protein gr.*	*Carbohydrate gr.*	*Fiber gr.*	*Fat gr.*	*Saturated fatty acid* gr.*
BREADS, CEREALS, GRAINS, AND GRAIN PRODUCTS (*Continued*)								
Spaghetti with meat sauce†	1 cup	250	285	13	35	.5	10	6
With tomatoes and cheese	1 cup	250	210	6	36	.5	5	3
Spanish rice with meat†	1 cup	250	217	4	40	1.2	4	—
Shredded wheat, biscuit	1	28	100	3	23	.7	1	—
Waffles, ½ by 4½ by 5½"‡	1	75	240	8	30	.1	9	8
Wheat germ	1 cup	104	245	27	34	2.5	7	3
Wheat-germ cereal, toasted§	1 cup	65	260	20	36	2.5	7	3
Wheat-meal cereal, unrefined	¼ cup‖	30	103	4	25	.7	1	—
Wheat, unground, cooked	¾ cup	200	275	12	35	4.4	1	—
SOUPS, CANNED, AND DILUTED¶								
Bean soups	1 cup	250	190	8	30	.6	5	4
Beef and vegetable	1 cup	250	100	6	11	.5	4	4
Bouillon, broth, consommé	1 cup	240	24	5	0	0	—	—
Chicken or turkey	1 cup	250	75	4	10	0	2	2
Clam chowder, without milk	1 cup	255	85	5	12	.5	2	t
Cream soups (asparagus, celery, etc.)	1 cup	255	200	7	18	1.2	12	11

Linoleic acid gr.	MINERALS					VITAMINS				
	Iron mg.	Calcium mg.	Phosphorus mg.	Potassium mg.	Sodium mg.	A units	B_1 mg.	B_2 mg.	Niacin mg.	C mg.
3	2	25	162	670	1,017	690	t	.1	2.1	13
2	2	45	135	407	955	830	t	t	1	15
—	1.5	35	98	577	790	1,260	t	t	1.7	15
—	1	13	122	116	1	0	t	t	1.3	0
1	1.4	124	150	114	327	310	.1	.2	1.1	0
3	5.5	57	744	550	5	0	1.4	.5	3.1	0
3	4.9	32	722	630	1	110	1.6	.9	4.1	0
—	1.1	15	130	126	1	0	.2	.1	1.4	0
—	1.6	40	400	174	1	0	.1	.1	4.8	0
t	2.8	95	254	445	1,007	260	t	t	1	2
t	.8	12	50	165	1,067	1,100	t	t	1	—
—	1	2	32	129	780	0	t	t	1	0
t	.5	20	75	—	751	0	t	.1	1.5	0
1	1	36	49	225	1,099	1,070	t	t	1	0
t	.5	217	157	295	1,058	200	t	.2	.1	0

* Includes oleic acid
† With tomatoes
t Indicates trace only
— No data available
‡ Contains 4% milk solids
§ Malt added
|| Measured before cooking
(No data available on soups prepared at home

FOOD	*Approximate Measure*	*Wgt. in gr.*	*Calories*	*Protein gr.*	*Carbohydrate gr.*	*Fiber gr.*	*Fat gr.*	*Saturated fatty acid* gr.*
SOUPS, CANNED AND DILUTED (*Continued*)								
Noodle, rice, barley soups	1 cup	250	115	6	13	.2	4	3
Split-pea soup	1 cup	250	147	8	25	.5	3	3
Tomato soup, diluted with milk	1 cup	245	175	6	22	.5	7	6
Vegetable (vegetarian)	1 cup	250	80	4	14	—	2	2
DESSERTS AND SWEETS								
Apple betty	1 serving	100	150	1	29	.5	4	—
Bread pudding with raisins	¾ cup	200	374	11	56	.2	12	11
Cakes, angelfood	1 slice	40	110	3	23	0	*t*	—
Chocolate cake, fudge icing	1 slice	120	420	5	70	.3	14	12
Cupcake with icing	1	50	160	3	31	*t*	3	2
Fruit cake, 2 by 2 by ½″	1 slice	30	105	2	17	.2	4	3
Gingerbread, 2″ cube	1 piece	55	180	2	28	*t*	7	6
Plain cake, without icing	1 slice	55	180	4	31	*t*	5	4
Sponge cake, without icing	1 slice	40	115	3	22	0	2	2
Candy, caramels	5	25	104	*t*	19	0	3	3
Chocolate creams	2	30	130	*t*	24	0	4	4
Fudge, plain, 1″ square	2 pieces	90	370	*t*	80	.1	12	11
Hard candies	1 oz.	28	90	*t*	28	0	0	0
Marshmallows, large	5	30	98	1	23	0	0	0
Milk chocolate	2-oz. bar	56	290	2	44	.2	6	6
Chocolate syrup	2 T.	40	80	*t*	22	0	*t*	*t*
Doughnuts, cake type	1	33	135	2	17	*t*	7	4
Gelatin, made with water	1 cup	239	155	4	36	0	*t*	*t*

Linoleic acid gr.	MINERALS					VITAMINS				
	Iron mg.	Calcium mg.	Phosphorus mg.	Potassium mg.	Sodium mg.	A units	B_1 mg.	B_2 mg.	Niacin mg.	C mg.
1	.2	82	45	69	1,224	30	*t*	*t*	.7	0
t	1.4	31	152	275	959	450	.2	.2	1.4	0
t	.7	167	155	417	1,055	1,200	*t*	.2	1.2	0
t	.8	32	40	170	855	2,900	*t*	*t*	1	8
—	.7	14	36	100	152	100	*t*	*t*	.4	1
t	2.2	218	228	430	400	600†	.1	.3	.2	0
—	.1	2	40	40	113	0	*t*	*t*	.1	0
1	.5	118	162	184	282	140†	*t*	.1	.3	0
t	.2	58	54	72	150	50	*t*	*t*	.1	*t*
t	.8	29	38	165	52	50†	*t*	*t*	.3	*t*
t	1.4	63	33	222	119	50†	*t*	*t*	.6	0
t	.2	85	50	40	150	70	*t*	*t*	.2	0
t	.6	11	49	32	70	210	*t*	*t*	.1	0
t	.8	40	22	48	55	40	*t*	*t*	*t*	0
t	.2	18	16	30	63	*t*	0	0	*t*	0
t	.1	13	72	132	180	50	*t*	*t*	*t*	0
0	0	0	0	0	8	0	0	0	0	0
0	0	0	2	2	13	0	0	0	0	0
0	.6	72	115	192	47	100	0	0	0	0
0	.5	0	36	120	20	0	0	0	0	0
3‡	.4	23	63	26	80	40	*t*	*t*	.4	0
0	0	0	0	0	122	0	0	0	0	0

* Includes oleic acid
t Indicates trace only
— No data available
† If made with butter or fortified margarine
‡ If fried in oil

FOOD	Approximate Measure	Wgt. in gr.	Calories	Protein gr.	Carbohydrate gr.	Fiber gr.	Fat gr.	Saturated fatty acid* gr.
DESSERTS AND SWEETS (*Continued*)								
Honey, strained	2 T.	42	120	t	30	0	0	0
Ice cream, custard, see Dairy products								
Ices, lime, orange, etc.	1 cup	150	117	0	48	0	0	0
Jams, marmalades, preserves	1 T.	20	55	0	14	t	0	0
Jellies	1 T.	20	50	0	13	0	0	0
Molasses, blackstrap	1 T.	20	45	0	11	0	0	0
Cane, refined	1 T.	20	50	0	13	0	0	0
Pie,† apple 1/7 of 9″-diam. pie	1 slice	135	330	3	53	.1	13	11
Cherry	1 slice	135	340	3	55	.1	13	11
Custard	1 slice	130	265	7	34	0	11	10
Lemon meringue	1 slice	120	300	4	45	.1	12	10
Mince	1 slice	135	340	3	62	.7	9	8
Pumpkin	1 slice	130	265	5	34	.8	12	11
Puddings, milk,‡ rice and bread§								
Sugar, beet or cane	1 cup	200	770	0	199	0	0	0
3 teaspoons or	1 T.	12	50	0	12	0	0	0
Brown, firm-packed, dark	1 cup	220	815	0	210	0	0	0
Syrup, maple	2 T.	40	100	0	25	0	0	0
Table blends	2 T.	40	110	0	29	0	0	0
Tapioca cream pudding	1 cup	250	335	10	42	0	10	9
NUTS, NUT PRODUCTS, AND SEEDS								
Almonds, dried	½ cup	70	425	13	13	1.8	38	28
Roasted and salted	½ cup	70	439	13	13	1.8	40	31
Brazil nuts, unsalted	½ cup	70	457	10	7	2	47	31
Cashews, unsalted	½ cup	70	392	12	20	.9	32	28

Linoleic acid gr.	MINERALS					VITAMINS				
	Iron mg.	Calcium mg.	Phosphorus mg.	Potassium mg.	Sodium mg.	A units	B_1 mg.	B_2 mg.	Niacin mg.	C mg.
0	.4	2	2	22	2	0	*t*	*t*	*t*	2
0	0	*t*	*t*	5	*t*	0	0	0	0	*t*
0	.1	14	*t*	19	3	*t*	*t*	*t*	*t*	1
0	.1	13	*t*	15	3	*t*	*t*	*t*	*t*	1
0	2.3	116	14	585	19	0	*t*	*t*	*t*	0
0	.9	30	9	185	3	0	0	0	0	0
1	.5	9	29	106	400	220	*t*	*t*	.3	1
1	.5	14	33	140	405	520	*t*	*t*	.3	2
1	1.6	162	151	182	382	300	*t*	.2	.4	0
1	.6	24	65	66	337	210	*t*	.1	.2	1
1	3	22	50	236	600	10	*t*	*t*	.5	0
1	1	70	92	219	285	2,480	*t*	.1	.4	8
0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0
0	5.7	167	38	688	60	0	0	0	0	0
0	.6	41	3	70	4	0	*t*	*t*	*t*	0
0	.3	2	1	10	1	0	0	0	0	0
1	1	262	265	337	390	580	.1	.4	.2	0
8	3.3	163	353	541	2	0	.2	.6	2.4	0
8	3.3	163	353	541	140	0	*t*	.6	2.4	0
12	2.3	124	464	476	1	*t*	.6	.1	1	0
2	2.9	29	242	325	40‖	70	.3	.1	1.2	0

* Includes oleic acid *t* Indicates trace only ‡ See Dairy products

† Crusts prepared with refined flour and hydrogenated fat

§ See Breads, Cereals, Grains, and Grain products ‖ Add 200 mg. for salted nuts

FOOD	*Approximate Measure*	*Wgt. in gr.*	*Calories*	*Protein gr.*	*Carbohydrate gr.*	*Fiber gr.*	*Fat gr.*	*Saturated fatty acid* gr.*
NUTS, NUT PRODUCTS, AND SEEDS (*Continued*)								
Coconut, shredded, sweetened	½ cup	50	274	1	26	2	20	19
Peanut butter, commercial†	⅓ cup	50	300	12	9	.9	25	17
Peanut butter, natural	⅓ cup	50	284	13	8	.9	24	10
Peanuts, roasted	⅓ cup	50	290	13	9	1.2	25	16
Pecans, raw, halves	½ cup	52	343	5	7	1.1	35	25
Sesame seeds, dry	½ cup	50	280	9	10	3.1	24	13
Sunflower seeds	½ cup	50	280	12	10	1.9	26	7
Walnuts, English, raw	½ cup	50	325	7	8	1	32	7
BEVERAGES								
Alcoholic, beer (4% alcohol)	2 cups	480	228	*t*	8	0	0	0
Gin, rum, vodka, whiskey (86 proof)	1 oz.	28	70	0	*t*	0	0	0
Wines, dessert (18.8% alcohol)	½ cup	120	164	*t*	9	0	0	0
Table (12.2% alcohol)	½ cup	120	100	*t*	5	0	0	0
Carbonated drinks								
Artificially sweetened	12 oz.	346	0	0	0	0	0	0
Club soda	12 oz.	346	0	0	0	0	0	0
Cola drinks, sweetened	12 oz.	346	137	0	38	0	0	0
Fruit-flavored soda	12 oz.	346	161	0	42	0	0	0
Ginger ale	12 oz.	346	105	0	28	0	0	0
Root beer	12 oz.	346	140	0	35	0	0	0
Coffee, black, unsweetened	1 cup	230	3	*t*	1	0	0	0
Tea, clear, unsweetened	1 cup	230	4	0	1	0	*t*	0

Linoleic acid gr.	MINERALS					VITAMINS				
	Iron mg.	Calcium mg.	Phosphorus mg.	Potassium mg.	Sodium mg.	A units	B_1 mg.	B_2 mg.	Niacin mg.	C mg.
t	1	8	56	176	0	0	*t*	*t*	.4	1
7	.9	29	154	309	300	0	.3	.1	6.2	0
7	1	30	204	337	2	0	.5	.1	7.9	0
7	1	37	200	337	2‡	0	.2	.1	8.6	0
7	1.2	36	144	300	*t*‡	60	.4	.1	.4	1
10	5.2	580	308	360	30	15	.4	.1	2.7	0
15	3.5	60	418	460	15	0	1.8	.2	13.6	0
20	1.5	50	190	225	1	15	.1	.1	.4	1
0	*t*	10	60	50	14	0	*t*	*t*	1	0
0	0	0	0	*t*	*t*	0	0	0	0	0
0	*t*	4	*t*	37	2	0	*t*	*t*	.1	0
0	.5	10	12	100	6	0	*t*	*t*	.1	0
0	0	0	—	—	—	0	0	0	0	0
0	0	0	—	—	—	0	0	0	0	0
0	0	0	—	—	—	0	0	0	0	0
0	0	0	—	—	—	0	0	0	0	0
0	0	0	—	—	—	0	0	0	0	0
0	0	0	—	—	—	0	0	0	0	0
0	.2	9	9	40	2	0	0	*t*	.6	0
0	*t*	*t*	*t*	58	*t*	0	0	*t*	*t*	0

* Includes oleic acid
t Indicates trace only
— No data available

† Sugar and hydrogenated fat added
‡ Add 200 mg. for salted nuts

FOOD	*Approximate Measure*	*Wgt. in gr.*	*Calories*	*Protein gr.*	*Carbohydrate gr.*	*Fiber gr.*	*Fat gr.*	*Saturated fatty acid* gr.*
SUPPLEMENTARY FOODS								
Bone meal or powder	½ t.	2.5	0	0	0	0	0	0
Eggshell	¾	4	0	0	0	0	0	0
Calcium carbonate	2 t.	3	0	0	0	0	0	0
Calcium gluconate	7½ t.	11	—	0	0	0	0	0
Calcium lactate	3½ t.	5	—	0	0	0	0	0
Dicalcium phosphate	1 t.	4	0	0	0	0	0	0
Desiccated liver, defatted†	¼ cup	37	120	28	3	1.6	*t*	—
Lecithin, granular	2 T.	15	105	0	0	—	11	9
Powdered yeast, brewer's debittered	¼ cup	33	91	13	12	.6	*t*	*t*
Primary, grown on molasses‡	¼ cup	33	115	16	11	2.3	4	—
Torula	¼ cup	40	148	20	10	.2	3	*t*
Torula, calcium fortified§	¼ cup	40	148	20	10	.2	3	*t*

	MINERALS					VITAMINS				
Linoleic acid gr.	*Iron mg.*	*Calcium mg.*	*Phosphorus mg.*	*Potassium mg.*	*Sodium mg.*	*A units*	*B_1 mg.*	*B_2 mg.*	*Niacin mg.*	*C mg.*
0	1.8	1,000	516	*t*	*t*	0	0	0	0	0
0	0	1,000	0	0	0	0	0	0	0	0
0	0	1,000	0	0	0	0	0	0	0	0
0	0	1,000	0	0	0	0	0	0	0	0
0	0	1,000	0	0	0	0	0	0	0	0
0	0	1,000	778	0	0	0	0	0	0	0
—	6	10	600	480	140	0	.2	4.4	11.3	70
1.2	*t*	*t*	500	*t*	*t*	—	—	—	—	—
t	5	70	584	631	40	*t*	5.2	1	12.9	0
—	2.5	82	231	600	165	0	8	8	33	0
2	7	90	600	800	6	0	6	6	40	0
2	7	600	600	800	6	0	10	10	100	0

---

*Includes oleic acid

t Indicates trace only

— No data available

† Supplies 370 milligrams of cholin, 74 of inositol, 5.5 of pantothenic acid, and 18.5 micrograms of vitamin B_{12} as well as other B vitamins

‡ One-half cup of flake yeast has the same nutrients as ¼ cup powdered

§ Fortified with calcium and magnesium as directed on page 93

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